DOCUMENT RESUME

ED 024 279

EM 006 973

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Special Education for the Gifted Through Television: Syllabus 1968-69. A Compendium of Information About a Special Educational Television Program Organized and Developed for Challenging the Productive-Divergent Thinking Potential of Gifted Students in Grades 5-6-7.

Educational Research and Development Council of Northeast Minnesota, Duluth.

Spons Agency-Office of Education (DHEW), Washington, D.C.

Pub Date Sep 68

Grant-OEG-3-7-703260-4955

Note-86p.

EDRS Price MF-$0.50 HC-$4.40

Descriptors-*Creative Thinking, *Educational Strategies, Educational Television, *Gifted, Grade 5, Grade 6, Grade 7, Instructional Television, Productive Thinking, *Program Descriptions, Teaching Models, Television Curriculum

Identifiers-ESEA III

Opportunities for creative thinking or training in the utilization of mental processes other than assimilation, storage, and recall can be provided by television instruction when encouraged by teaching strategy. This syllabus presents a model for teaching productive-divergent thinking with 54 one-half hour telecasts on the theme of "You and Tomorrow: Living in the 21st Century." Synopses of the programs describe content, concepts, and strategy. (TI)

ED024279

# SPECIAL EDUCATION FOR THE GIFTED
# THROUGH TELEVISION

## Syllabus 1968-69

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Mrs. Mary M. Pilch
Project Director

September 1968

Project Funded Under Title III P. L. 89-10
The Elementary and Secondary Act of 1965
Project No. OE 67-03260-1
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Grantee: Educational Research and Development Council
of Northeast Minnesota

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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The work presented or reported herein was performed pursuant to a Grant from the U. S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

EM006973

# ACKNOWLEDGEMENTS

Planning and organizing the various aspects essential to the production of the 54 half-hour television programs herein described required much time, effort, a variety of skills, and the innovative ideas of many persons. The project is indebted to all who through their individual involvement and competencies made possible the creation and completion of this television series. With gratitude we acknowledge the participating personnel.

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# TABLE OF CONTENTS

PAGE

Instructional Television. . . . . . . . . . . . . . . . . . . . . . . . . . . 1

Programs. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 4

Telecasting Guide. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5

Model For Teaching Productive Divergent Thinking. . . . . . . . . . . . 6
Discussion Of The Model. . . . . . . . . . . . . . . . . . . . . . . . 9

Synopses. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 14
Program No. 1 . . . . . . . . . . . . . . . . . . . . . . . . . 15
Program No. 2 . . . . . . . . . . . . . . . . . . . . . . . . . 18
Program No. 3 . . . . . . . . . . . . . . . . . . . . . . . . . 21
Program No. 4 . . . . . . . . . . . . . . . . . . . . . . . . . 24
Program No. 5 . . . . . . . . . . . . . . . . . . . . . . . . . 28
Program No. 6 . . . . . . . . . . . . . . . . . . . . . . . . . 31
Program No. 7 . . . . . . . . . . . . . . . . . . . . . . . . . 34
Program No. 8 . . . . . . . . . . . . . . . . . . . . . . . . . 37
Program No. 9 . . . . . . . . . . . . . . . . . . . . . . . . . 40
Program No. 10 . . . . . . . . . . . . . . . . . . . . . . . . 44
Program No. 11 . . . . . . . . . . . . . . . . . . . . . . . . 47
Program No. 12 . . . . . . . . . . . . . . . . . . . . . . . . 50
Program No. 13 . . . . . . . . . . . . . . . . . . . . . . . . 54
Program No. 14 . . . . . . . . . . . . . . . . . . . . . . . . 60
Program No. 15 . . . . . . . . . . . . . . . . . . . . . . . . 64
Program No. 16 . . . . . . . . . . . . . . . . . . . . . . . . 67
Program No. 17 . . . . . . . . . . . . . . . . . . . . . . . . 70
Program No. 18 . . . . . . . . . . . . . . . . . . . . . . . . 73

BIBLIOGRAPHY. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 77

APPENDIX A . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 81

# Instructional Television

Means of communicating information through audio-visual media have been part of an educational and technological revolution in progress during the past quarter of a century. Such instructional media devices present a wide range of methods for storing information as well as a reliable means for retrieving it quickly and efficiently. They involve two forms of processing, the electronic storage of audio information and the storage of images on films or plastics. Images stored on tape and plastics appeal to the combined visual and aural senses of the learner and can be used by the teacher as an effective adjunct to her role in the classroom.

Instructional television is a device using both forms of processing. Its value as a teaching tool has been successfully demonstrated. It is a learning resource. Like all other forms of instructional media it aids in transmitting information and learning via the senses. It is an audio-visual stimulus designed as an external device for processing inputs to a receiver. It is neither designed nor intended to replace the teacher, nor to serve as a substitute for activities involving vital teacher-student relationships.

Increasing the richness of stimulus input into a student's repertoire of knowledge and allowing him opportunities to work with such inputs can contribute significantly to the nurturing of creative potential, providing they are designed or used in the right way for this purpose. By fusing past knowledge with the flow of new information to produce original insights or unusual responses creativity on the part of the learner takes place; for the process of creating is in large measure associating or putting together into new and original combinations the elements of information which one has previously acquired. Frank E. Williams states this succinctly when he says, "However, research indicates that mere saturation of an individual with input information may have to be integrated with instructions or cued directions to be creative. Opportunities for creating, or training in the utilization of mental processes other than assimilation, storage, and recall are necessary. The processes of exploring new associations from an array of input information are necessary prerequisites to making discoveries, and such opportunities must be granted students in order to develop their abilities for productive-creative thinking.....The problem becomes that of how this can be done either by the media device itself or by the teacher creatively using the device, or both. An interaction between the teacher and the device is necessary when attempts are made to structure or reorganize the presentation of input information for the student so as to produce student outputs to include all of the fluencies, flexibilities, elaborations, and original interpretations of knowledge that comprise the creative process. The teacher can then become a catalyzer in producing a need to create. The instructional-media device is used as a vehicle for a rich source of input which may then set the stage for the creative act to follow."

The specific advantages of this instructional television series which has been organized for teaching gifted students are noted below. They reflect the objectives of the project. They also provide a basis for the assumption that they can contribute much to the improvement of instruction for this segment of the school population who by evidence of their unique capacities and characteristics deserve to have some special time and attention provided during their regular school day for nurturing their varied talents. These televised programs can, therefore, be said:

1. Motivate student learning. The visual impact of the presentations serves as a means for involving the learner in the new knowledge.

2. Make possible the upgrading and differentiating of their curriculum so as to really "enrich" their educational experiences. They provide a means of introducing supplemental new content and new techniques; approaches to their learning experiences in school.

3. Present material to the student that would otherwise not be available to him in the ordinary classroom - school expectations of his community.

4. Present materials as dramatizing events with which the students can closely identify in the act of creation.

5. Demonstrate activities for developing productive-divergent thinking which can be used with or without modification by any teacher in another situation.

6. Take into account the intellectual level of the intended audience, and, the factor of individual and group differences, i.e., intelligence, grade level, reading comprehension, creativeness, etc.

7. Demonstrate the utilization of the principles of creative thinking and problem-solving, i.e., analogies, paradoxes, metaphors, attribute listing, deferring judgement, check-listing, etc.

8. Lead students to self-generated activities, independent thinking, goal-setting, and posing their own problems.

9. Deal with generalized problem-solving skills, i.e., preparation, incubation, illumination, ideation, verification, etc.

10. Demonstrate and analyze creative teaching; what it is and how to do it.

11. Teach students how to live with change - how to change the environment rather than always to adjust to the environment.

12. Demonstrate new teaching materials or how to convert old materials to the productive-divergent thinking paradigm.
13. Demonstrate the techniques and methodology of research.
14. Dramatically show man in the process of creation and how he reaches into the unknown.
15. Show man in the process of toying with new ideas or new information.
16. Demonstrate how teachers can reinforce creative behaviors in classroom situations.
17. Explore perplexing social problems with no easy or quick solution or which require creative solutions.
18. Show the development of ideas instead of products.
19. Illustrate how to get these students to identify a problem and require them to form their own hypotheses of how it might be solved.
20. Take students to the forefront of scientific endeavors to give them the feeling of participation and stimulation in innovative and adventuresome processes.

# PROGRAMS

## 1968 - 1969

It is assumed that the gifted students viewing these telecasts possess a greater reservoir of potential talents then has average students. It is also assumed that these students may well be the citizens of the 21st Century who will be working, contributing, and performing in the many complex leadership roles essential to maintain and assure adequate standards for the health, welfare, happiness and security of the people of our nation. The central theme of the total program has therefore, been designated as YOU AND TOMORROW. The thematic subtopics and the films selected for the Content Series illustrate areas of major concern in providing substantive background for the development of the thinking and learning processes demonstrated in the Process Series. It is therefore, recommended that all students who have been classified as being in the gifted ranges of abilities see both these half-hour programs, to assure continuity and to provide a basis for adequate individual involvement in anticipated follow-through activities.

For total impact and to encourage understanding of the intent of the programs teachers are urged to see all three half-hour programs if possible. The content of this syllabus has been planned so as to provide background information about each half-hour session and their content. The Inservice Series has been specifically developed for viewing by teachers and other professional educators. These programs contain a discussion of the learning theory and the research evidence about the processes demonstrated in the Process Series.

### Program Arrangement

Content Series - 12:30 - 1:00 p.m. Commercial films
Process Series - 1:00 - 1:30 p.m. Original scripts demonstrating classroom strategies for developing productive-divergent thinking
Inservice Series - 3:30 - 4:00 p.m. Original scripts interpreting for teachers the theory and research demonstrated in the Process Series.

### Program Dates

Eighteen weekly broadcasts - Tuesdays - Starting October 15, 1968

| 1968 | 1969 |
|---|---|
| October 15, 22, 29 | January 14, 21, 28 |
| November 5, 12, 19, 26 | February 4, 11, 18, 25 |
| December 3, 10 | March 4, 11 |

### Selected Viewing Audience

All content strategies and discussions in the first two series have been organized to develop the productive-divergent thinking potential of gifted students in grades 5, 6 and 7.

The Inservice Series is exclusively planned for viewing by teachers and other adults. They interpret the theory and research demonstrated in the two preceding series.

Telecasting Guide For 1968-69 Programs

Theme: YOU AND TOMORROW

Living In The 21st Century

| Thematic Subtopics | Program Number | Film Titles | TV Teachers | Broadcasting Dates |
|---|---|---|---|---|
| In Search of Space<br>A. For Controlling The Population Explosion | 1 | Urban Sprawl | Mr. Lloyd Kornmann | 10-15-68 |
| | 2 | People By The Billions | Mr. Lloyd Kornmann | 10-22-68 |
| | 3 | The Global Struggle For Food | Mr. Lloyd Kornmann | 10-29-68 |
| | 4 | The City and Its Future | Miss Judith Tidemann | 11-05-68 |
| | 5 | Achievement In Hong Kong | Miss Judith Tidemann | 11-12-68 |
| B. For Solving Transportation Problems | 6 | Why Explore Space | Mr. Charles Burnside | 11-19-68 |
| | 7 | Exploring By Satellite | Mr. Charles Burnside | 11-26-68 |
| C. For Implementing New Communication Systems | 8 | Communication and the Community | Mr. Charles Burnside | 12-03-68 |
| In Search of Health<br>D. For Nurturing Mans' Health | 9 | Man Alive | Mrs. Bella Kranz | 12-10-68 |
| | 10 | The First Mile Up | Mrs. Bella Kranz | 1-14-69 |
| | 11 | On Prescription Only | Mrs. Bella Kranz | 1-21-69 |
| In Search of Adequate Education<br>E. For Competing In A Complex Technical Society | 12 | Tomorrow's Government Today | Mr. Earl Anthony | 1-28-69 |
| | 13 | Automation: What It Is And What It Does - What Is Automation | Mr. Earl Anthony | 2-04-69 |
| | 14 | The Computer and The Mind of Man | Mr. Earl Anthony | 2-11-69 |
| In Search of Beauty<br>F. For Inspiring Man's Joy In Living | 15 | Design For Living | Mrs. Glenda Peterson | 2-18-69 |
| | 16 | Enduring Wilderness | Mrs. Glenda Peterson | 2-25-69 |
| | 17 | Brazilia | Mrs. Glenda Peterson | 3-04-69 |
| | 18 | Discovering Creative Patterns - Painting: The Creative Process | Miss Judith Tidemann | 3-11-69 |

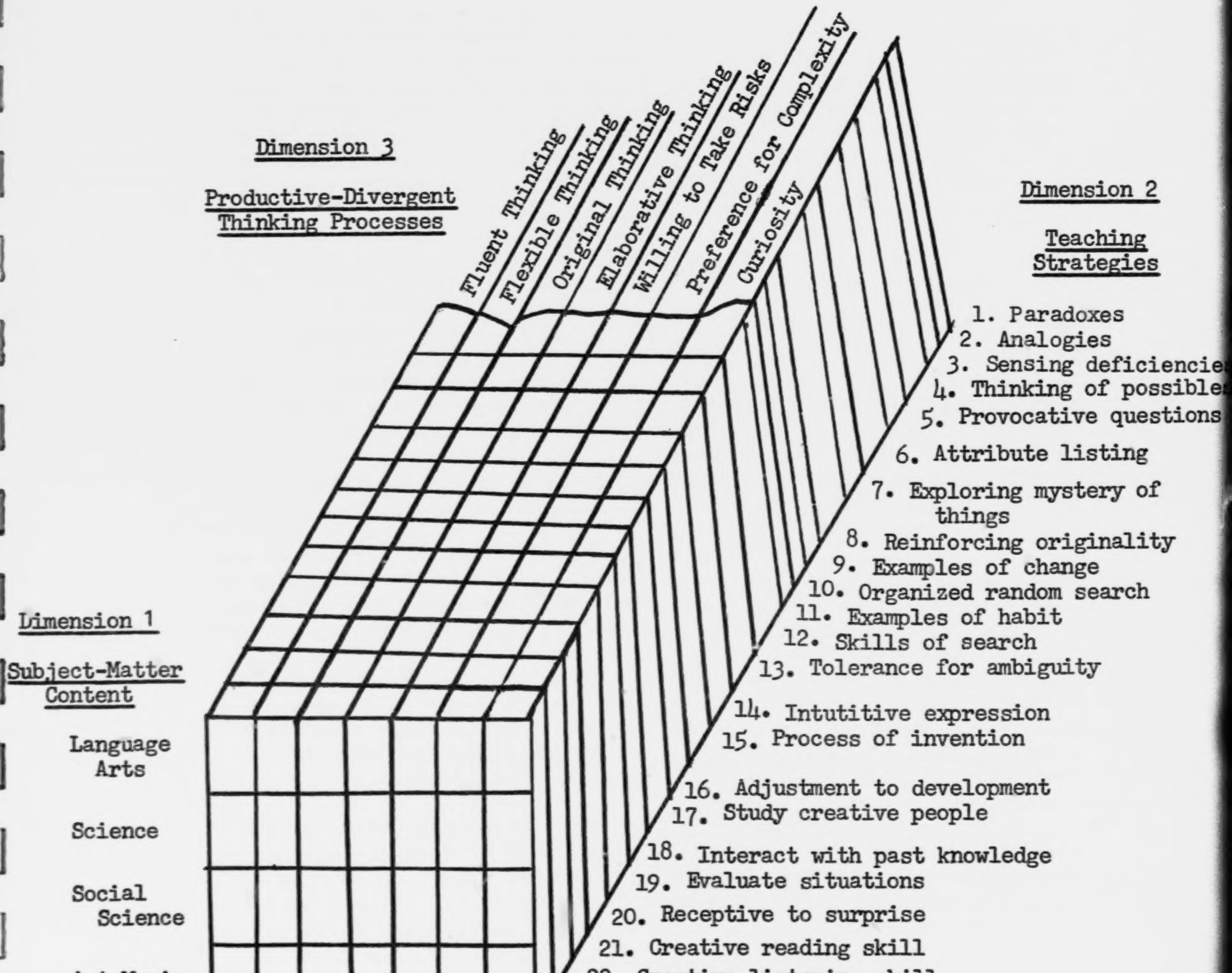
# Dimension 2
# Of
# Model For Teaching Productive-Divergent Thinking

## TEACHING STRATEGIES

| NAME | MEANING |
|---|---|
| No. 1 - Paradoxes | Situation opposed to common sense<br>Self-contradictory statement or observation |
| No. 2 - Analogies | Situations of likeness<br>Similarities between things |
| No. 3 - Sensing Deficiencies | Gaps in knowledge<br>Missing links in information |
| No. 4 - Thinking of Possibles | Guessing or forming hypotheses<br>Thinking of probabilities |
| No. 5 - Provocative Questions | Inquiry to bring forth meaning<br>Incite knowledge exploration |
| No. 6 - Attribute Listing | Inherent properties<br>Conventional symbols or identities |
| No. 7 - Exploring Mystery of Things | Detective work on unfamiliar knowledge<br>Examine unnatural phenomena |
| No. 8 - Reinforcing Originality | Rewarding original thinking<br>Strengthen unlikely but relevant responses |
| No. 9 - Examples of Change | Demonstrate the dynamics of things<br>Provide opportunities for making alterations, modifications or substitutions |
| No. 10 - Organized Random Search | Use a familiar structure to lead at random to another structure<br>Case studies from which new courses of action are devised |
| No. 11 - Examples of Habit | Discuss the effects of habit-bound thinking<br>Build a sensitivity against rigidity in ideas |
| No. 12 - Skills of Search | Consider ways something has been done before<br>Trial and error on new ways<br>Control experimental conditions |
| No. 13 - Tolerance for Ambiguity | Provide encounters which challenge thinking<br>Pose open-ended situations |
| No. 14 - Intuitive Expression | Skill of expressing emotion<br>Feeling about things through all of the senses |
| No. 15 - Process of Invention | Steps of problem-solving leading to invention<br>Study the incubation process leading to insight |
| No. 16 - Adjustment to Development | Examine how failures, or accidents, have paid off<br>Learn how to learn from mistakes |
| No. 17 - Study Creative People | Analyze traits of eminently creative people<br>Study the process which has led to creation |
| No. 18 - Interact with Past Knowledge | Nurture ideas from previously stored knowledge<br>Allow opportunities to toy with information already acquired |
| No. 19 - Evaluate Situations | Extrapolate from the results of ideas and actions<br>Deciding upon solutions in terms of their consequences and implications |
| No. 20 - Receptive to Surprise | Capitalize upon unexpected ideas<br>Alert to the significance of novel thoughts |
| No. 21 - Creative Reading Skill | Learn the skill of idea generation by reading<br>Develop a utilitarian mind-set for information |
| No. 22 - Creative Listening Skill | Learn the skill of idea generation by listening<br>Listen for information which allows one thing to lead to another |
| No. 23 - Visualization Skill | Express ideas in three-dimensional forms<br>Practice describing views from unaccustomed vantage points |

# MODEL FOR TEACHING PRODUCTIVE-DIVERGENT THINKING
# THROUGH SUBJECT-MATTER CONTENT

Frank E. Williams
Macalester College
Saint Paul, Minnesota


Dimension 3
Productive-Divergent Thinking Processes
Fluent Thinking
Flexible Thinking
Original Thinking
Elaborative Thinking
Willing to Take Risks
Preference for Complexity
Curiosity
Dimension 2
Teaching Strategies
1. Paradoxes
2. Analogies
3. Sensing deficiencie
4. Thinking of possible
5. Provocative questions
6. Attribute listing
7. Exploring mystery of things
8. Reinforcing originality
9. Examples of change
10. Organized random search
11. Examples of habit
12. Skills of search
13. Tolerance for ambiguity
14. Intutitive expression
15. Process of invention
16. Adjustment to development
17. Study creative people
18. Interact with past knowledge
19. Evaluate situations
20. Receptive to surprise
21. Creative reading skill
22. Creative listening skill
23. Visualization skill
Dimension 1
Subject-Matter Content
Language Arts
Science
Social Science
Art-Music

## Dimension 3
## Of
## Model For Teaching Productive-Divergent Thinking

## THINKING PROCESSES

| NAME | MEANING |
|---|---|
| FLUENT THINKING | Generation of a quantity<br>Who thinks of the most ideas<br>Flow of thought<br>Number of relevant responses<br>Ability to produce the most in a given time |
| FLEXIBLE THINKING | Number of different approaches<br>Variety of kinds of ideas<br>Ability to shift categories<br>Versatility to change in focus<br>Detours in direction of thought |
| ORIGINAL THINKING | Unusual responses<br>Clever ideas<br>Novel but relevant approaches<br>Production away from the obvious<br>Infrequent thought within the group or from one's own repertoire of responses |
| ELABORATIVE THINKING | Embellishing upon an idea<br>Add necessary details to work out a new thought<br>Production of detailed steps<br>Embroider upon a simple idea or response to make it more elegant<br>Sketch or expand upon things or ideas |
| WILLINGNESS TO TAKE RISKS | Sets greater goals for greater gains<br>Trys out adventurous tasks<br>Ventures to guess<br>Enjoys activities involving chance |
| PREFERENCE FOR COMPLEXITY | Ability to handle involved details<br>Likes to toy with intricate ideas<br>Can cope with knotty solutions or problems<br>Challenged by complications<br>"Digs into" difficult problems or solutions |
| CURIOSITY | Thrives on novel routes or choices<br>Exploratory behavior directed toward acquiring information<br>Examines things and ideas<br>Preference for the unknown or the unfamiliar<br>Capacity to wonder about things which may lead somewhere |

## DISCUSSION ON THE MODEL

### Dimension 1

Merely lists the subject matter areas of a conventional elementary school curriculum.

### Dimension 2

Lists the styles or strategies which teachers can employ in the classroom. All of these are based upon a rationale developed from some research finding either concerning the nature of the productive thinking process, the creative personality, or the classroom climate conducive for productive-creative thinking. The listed strategies become a means through subject matter areas toward an end for fostering an intellectual growth in those behaviors which manifest productive-creative thinking. As one views these twenty-three teaching styles which can be applied across all subject matter areas, a vast number of combinations for learning and thinking become apparent. In order to aid teachers in experimenting with ways to utilize each of these strategies, the following examples are cited:

1. Using paradoxes or teaching by examples of paradoxical situations. These are tenets contrary to opinion, situation opposed to common sense but true in fact, or inconsistencies between things people hold as true. For example, in social studies have students think about and explore problems of poverty in the midst of plenty in the world today. Ask students in science to disprove "old wives" tales. This is a technique for sensitizing students to evaluate things and brings about exciting ways for testing and proving.

2. Use analogies or many situations of likeness. Point out new information, facts, or principles by looking at similar situations in terms of things students already know. Show how scientific products have been developed out of analogous situations in nature, i.e., radar invented from the instinct of reflected sound waves among bats; airplane cargo doors designed like the opening of a clam shell; or the built-in-seam of weakness of the pea pod used in the whole area of packaging. Teachers can use animated pictures and films of animals solving problems of existence, survival, and innovation and ask students how their behavior might parallel that of man.

3. Teach by using many examples of deficiencies; that is, ask students to think about what man does not know instead of telling students what man knows. Develop the students skill for looking at gaps, unknowns, or missing elements of information. Allow time for reflective thinking about inconsistencies in knowledge. Point out the difference between problems of fact and problems of logical consistency and how few of the latter kind there are. Use the

technique of asking students to list the things that bother people, things people need, or things wrong with something. Ask students to search for all possible definitions of a problem as something that is wrong. Allow opportunities for students to write or tell about all the observable things that to them cause puzzlement (in nature - in human nature, and in the world of things). Cite example where our perceptions in the world of conceptualization do not always match the real world of reality. Provide a "pigeon loft" in the school or classroom where the student can go to wonder. All such techniques aid in developing evaluative thinking.

4. Allow for thinking about possibles, probables, making guesses, or hypothesizing. Provide opportunities for students to answer questions of "what if?" or "In what other ways?" Allow time for guessing and discussing the difference between "wild" and "educated" guesses. Point out how one thing leads to another and the importance of lingering over information or knowledge in order to allow one thing to lead to another. Teach a fact or concept such as a definite process proven and known to solve a problem (algorithm) but allow the student to think of other possibilities that might solve the problem but need not solve it (heuristic).

5. Use the inquiry training method of asking provocative questions. Point out the difference between factual type questions (how much?, how many?, what is?, who?) and questions which require depth of comprehension (how would you?, in what other ways?, what if?, how else?). Use many categories of questioning such as those which require translation, interpretation, extrapolation, identification, discovering, synthesizing, and analyzing. Use pictures and films and have students list all of the questions they can ask about the film. Use a check list of question categories such as longer, larger, shorter, smaller, adding, multiplying, taking away, changing, combining and reversing. Allow students to be as sensitive to question asking as they are to answer finding.

6. Use the technique of attribute listing or pointing out inherent properties. We do this in many areas such as analyzing the use of a word in a sentence (noun, verb, etc.) or the letters in the spelling of a word, or the numbers or unit in an arithmetic problem. Develop the skill of analyzing the inherent properties of a thing by mentally taking it apart and thinking about its parts instead of a whole. For example, in an originality exercise ask for new and unusual uses for commonly known things such as a lead pencil. Then point out how to think in terms of using the inherent properties of its many parts (wood, lead, rubber, metal, etc.). Such exercises lead to flexible thinking.

7. Provide opportunities for students to explore the mystery of things. Use the technique of doing detective work on the mysteries of nature, science, and social science. In such explorations allow the student to deduce the next step, apply and verify it. Use films to present the mysteries of scientific or social phenomena.

8. Allow for and reward original thinking. Provide opportunities for students to think of things no one else has thought of. Pose the

situation in all subject areas where the student is told he knows more about something than anyone else; then have him tell it, write it, or act it. Allow time to reinforce answers different from the ones in the book. Score or penalize a likely response and reward unlikely responses. Conduct an "idea bee", a "question bee", or an "answer bee" like a "spelling bee" where only unusual responses are rewarded the same as the best speller.

9. Cite the importance for change and use many examples of change. Teach the skill for change of things rather than adjustment to things. Use stories and films depicting change in nature and parallel these to human change.

10. Design case study approaches around some organized structure of knowledge which can in turn lead to a random search for other knowledge. Organize information to a certain point and then pose the question, "What would you do?"---or "would have done?" For example, allow the student to become identified with some historical situation or personality which provides the organized structure but gives no course of action or solution. Then allow the student to search at random what he would have done to solve the problem. Present unsolved social issues or scientific problems and ask the student to go off into his own "unknown areas of information" to seek solutions. Pose the question of how a field of knowledge as it is now conceived might be 50 or 100 years from now. Identify an area of subject matter by story, picture, or problem and ask the student to generate all of the causes and consequences of that area of knowledge. Use a film which identified a situation or problem (organized structure) and then stop the film to allow the student to create or design his own information at random to bring the situation to a completion. Upon solving a problem (organized structure) ask the student to think at random about as many problems as he can that the solution might cause (implications).

11. Teach about rigidities, fixations and habit. Show how the lives and functions of men and machines have been influenced by habit-bound thinking. Use examples of principles and techniques; both in the field of arts and sciences, that have remained unchanged or unimproved because of habit. Such examples in science as jet propulsion, known by the Chinese before the birth of Christ and innovations in the art of communications could be used.

12. Teach the skills of search as ways in which men seek for truths. Teach the processes of the scientific method as well as the basic areas of research. Develop skills in: A. Historical search - how someone else has done it, or solved it. B. Descriptive Search - such as describing, comparing, and contrasting several methods, as well as trial and error search. C. Controlled search through experimental observations. This involves looking for cause and effect, drawing conclusions, analyzing results, identifying causes and consequences, and drawing implications.

13. Build a tolerance for ambiguity by setting purposeful blocks in the learning process. It is well know that students learn when confronted with problem situations. Lead the learning situation up

to a definite point and then stop; allowing the student to toy with information; be puzzled, intrigued, involved or challenged. This is a good technique which leads to more self-directed learning.

14. Provide many opportunities which allow for intuitive expression. Ask students to write, tell, or dramatize their feelings, hunches, intuitions, and emotions about something. Use examples across subject matter areas which show how hunches have paid off. Use other examples of how innovative people have ended up in trouble and why. Provide many opportunities for the expression of feelings across all of the senses; i.e., feel box, color, sounds and noise etc. Use all of the senses for feeling expression.

15. Teach the processes of invention and innovation by using many guided-planned learning experiences. Show how inventions and patents have paid off only through original thinking and sustained effort, hard work, and a great deal of knowledge.

16. Use examples of development instead of adjustment. Show how failures, mistakes, and accident have lead to the development of worthwhile things. (serendipity). Even though our culture is strongly success-oriented, use a reverse process by showing how unsuccessful acts or events have been turned to success. Teach the skill of learning how to learn from mistakes. Mistakes are at least proof of an individual's effort. As an example, use some of the films depicting early unsuccessful attempts of man to fly, and point out how the science of flight profited by such mistakes. Use other examples in science and medicine.

17. Study creative individuals in the process under which they create. Analyze the traits and characteristics of eminently creative people through study of biographies and anecdotal data. Study creative personal creativity. Study the process of creative people interacting with other people - - social creativity. Study the process and development of a creative product - productive creativity. Use career films showing creatively successful people on the job. Point out idiosyncrasies of creative people; i.e., early life anxieties, conflicts, fears, uncertainties. Emphasize how problems were overcome or contributed to a person's own creativity. Show how truly creative behavior comes out of personal and social discomfort and maladjustment, deep concern and a great amount of perseverance.

18. Allow students to interact with themselves and their past knowledge. Provide them many opportunities to toy with information that they already know instead of always expecting them to continue acquiring new information. Teach the skill of how to nurture infant ideas by combining new associations out of what is already known. Provide students with a multitude of experiences for doing something with facts and information which they already possess. Allow many experiences for categorization behaviors including opportunities to classify information and to discriminate between kinds and types of information.

19. Evaluate solutions and answers in terms of their consequences and implications. Always pose the questions "what if?" Provide

opportunities for listing things that might happen as a result of - - -. Teach for cause and effect and require the students to extrapolate from information.

20. Develop skills in being receptive to surprise and unexpected responses, ideas or solutions with an alertness to their significance. Use many examples of constructive discontent. This implies not only being discontent about something but also being able to generate some constructive ideas of how the things might be improved. Teach for the skill of embellishing or elaborating upon information or knowledge. Show how old items can be used in new ways by adding motion, color, odor, light etc. Teachers as well as students should learn how to handle and capitalize upon surprizing responses in the classroom. Take advantage of the significance of unusual, remote responses.

21. Develop skills in reading creatively. Ask students to state as many ideas as they can which occur to them during their reading rather than to state specifically what it was that they read. Point out the differences between reading as an information acquiring process, and reading which leads to idea generation and development. Reading can teach a student about someone elses ideas or information but it can also stimulate the student to new ideas and information of his own.

22. Likewise, develop the skill of listening creatively. Listen for information which leads to other things rather than only what was heard.

23. Emphasize and practice the skill of simple perception. Draw attention to shapes, colors, rhythms, textures, sounds and odors. Provide opportunities for students to perceive or visualize themselves in many contexts. For example, ask the student to perceive himself as a molecule undergoing the process of osmosis, etc. Provide many opportunities for the student to find gratifications in perceiving with all his senses the world in which he lives.

## Dimension 3

In order to measure and/or observe the thinking behaviors brought about by the utilization of the various teaching styles or strategies across subject matter content as discussed above, the primary mental abilities which make up the productive-divergent process are used.

## Telecasting Guide For 1968-69 Programs

### Theme: YOU AND TOMORROW

### Living In The 21st Century

| Thematic Subtopics | Program Number | Film Titles | TV Teachers | Broadcasting Dates |
|---|---|---|---|---|
| In Search of Space<br>A. For Controlling The Population Explosion | 1 | Urban Sprawl | Mr. Lloyd Kornmann | 10-15-68 |
| | 2 | People By The Billions | Mr. Lloyd Kornmann | 10-22-68 |
| | 3 | The Global Struggle For Food | Mr. Lloyd Kornmann | 10-29-68 |
| | 4 | The City and Its Future | Miss Judith Tidemann | 11-05-68 |
| | 5 | Achievement In Hong Kong | Miss Judith Tidemann | 11-12-68 |
| B. For Solving Transportation Problems | 6 | Why Explore Space | Mr. Charles Burnside | 11-19-68 |
| | 7 | Exploring By Satellite | Mr. Charles Burnside | 11-26-68 |
| C. For Implementing New Communication Systems | 8 | Communication and the Community | Mr. Charles Burnside | 12-03-68 |
| In Search of Health<br>D. For Nurturing Mans' Health | 9 | Man Alive | Mrs. Bella Kranz | 12-10-68 |
| | 10 | The First Mile Up | Mrs. Bella Kranz | 1-14-69 |
| | 11 | On Prescription Only | Mrs. Bella Kranz | 1-21-69 |
| In Search of Adequate Education<br>E. For Competing In A Complex Technical Society | 12 | Tomorrow's Government Today | Mr. Earl Anthony | 1-28-69 |
| | 13 | Automation: What It Is And What It Does - What Is Automation | Mr. Earl Anthony | 2-04-69 |
| | 14 | The Computer and The Mind of Man | Mr. Earl Anthony | 2-11-69 |
| In Search of Beauty<br>F. For Inspiring Man's Joy In Living | 15 | Design For Living | Mrs. Glenda Peterson | 2-18-69 |
| | 16 | Enduring Wilderness | Mrs. Glenda Peterson | 2-25-69 |
| | 17 | Brazilia | Mrs. Glenda Peterson | 3-04-69 |
| | 18 | Discovering Creative Patterns - Painting: The Creative Process | Miss Judith Tidemann | 3-11-69 |

# SPECIAL EDUCATION FOR THE GIFTED THROUGH TELEVISION

## SYNOPSES
## OF
## THE 54 HALF-HOUR PROGRAMS
## FOR
## 1968-69

A Compendium Of Comprehensive Digests Describing
The Content And Strategies Used In Each Program

Editor
Mrs. Mary M. Pilch
Project Director

Material Prepared By Master Teachers

Program No. 1
Content Series No. 1
Master Teacher - Lloyd Kornmann

Thematic Subtopic:
In Search Of Space For Controlling The Population Explosion

Film:
URBAN SPRAWL 15 min., 16mm, snd., color, Arthur Barr Productions

Film Digest:

In the past, most city workers lived within the compact unit of the city. Today, thousands seek living space outside its boundaries and the city has become the nucleus of a sprawling metroplitan area. As people move outward in search of open space to build their homes, farms and hillsides disappear beneath rows of houses. Shopping centers and industry also move outward, competing for land space. Where industry goes, more people follow and onward and outward go the subdivisions.

The uncontrolled growth results in the cluttered, haphazard patchwork of housing that surrounds all our large cities. Valuable land is wasted and the open space sought by suburban dwellers is destroyed. Ever increasing problems of administration and servicing face the sprawling suburbs. The rush to the suburbs leaves behind a deteriorating central city, its streets filled by commuting traffic.

Urban growth must be planned to make wise use of available land space and to meet the total needs of people. Housing, schools, public facilities, shopping area, industrial sites--all must be planned on a long-range basis within a logical framework that considers the best land use and a coordinated development of the total metropolitan area. Aesthetic values and open space for public use must be considered as well as highway construction and water availability. How well we live tomorrow depends on the action we take today.

Film Concepts:
1. Over ½ of the people of the world live in urban regions.
2. Man's land is being consumed by the urban sprawl without any overall planning.
3. Man's service needs are becoming greater each day.
4. The central core of the city is adversely influenced by the urban sprawl.
5. Commuting workers create traffic problems.

Vocabulary:

sprawling
urban
suburban
deteriorating
commuting
nucleus
metropolitan
encroachment

Provocative Questions:
1. What are the problems created by uncontrolled urban sprawl?
2. Can planning today solve the problems created by the lack of planning in the past?
3. What kinds of legislative action are needed to implement plans for future urban growth?
4. At what levels of government should these laws be initiated?

Program No. 1
Process Series No. 1
Master Teacher - Lloyd Kornmann

Concepts Emphasized:

1. The city as it is now and as it may be in the future.
2. The tasks necessary to accomplish this change in design.
3. The shift of population from rural to urban and metropolitan through uncontrolled, unplanned growth has brought on many new problems.
4. The solutions to these problems are not simple nor solved by a single group or approach.

Strategies Demonstrated:

I will use problem-solving through recognition of a problem; analysis of a problem, suggestions for possible solutions, testing consequences, and judgement of the selected solution.

First, I will establish the hypothesis; Can planning today solve the problems created by the lack of planning in the past?

Second, we will try to understand the nature of the problem through the analysis or interpretation of unplanned and uncontrolled growth in specific situations.

Third, through extrapolation we will try to offer suggested solutions. If all this is true, what will happen next? Trends and tendencies will suggest possible solutions.

Fourth, we will test one of our solutions through reviewing data on transportation needs and uses and derive implications for the future.

Fifth, we will judge some of our possible solutions. We will infer by looking at the present governmental structure that a change in structure is needed.

Program No. 1
Inservice Series No. 1
Master Teacher - Lloyd Kornmann

## Interpretation and Discussion of Strategies

One of the best ways to learn is by the problem-solving method. Gagne's eight steps of learning through use of this method are discussed. In addition, an explanation of the role of the student in the problem-solving process as developed by Getzel is referred to.

Research reports on retention of ideas versus retention of factual material is mentioned. Also reported on are discovery versus rote-learning and no-help discovery; how to learn problem-solving techniques; evidence on the effects of teaching by the problem-solving technique; and how to transfer the problem-solving method in the classroom to actual application in real life situations.

In applying the theory and research information on problem-solving, classroom examples will be given in such classes as mathematics, music, art, physical education, home economics, and English.

Teachers can see how the application of one topic through the problem-solving approach could penetrate most of the student's curriculum. The learning process could thus be integrated with great possibility for stimulating their productive-divergent thinking.

Program No. 2
Content Series No. 2
Master Teacher - Lloyd Kornmann

Thematic Subtopic:
In Search Of Space For Controlling The Population Explosion

Film:
PEOPLE BY THE BILLIONS 28 min., 16mm, snd., b&w, National Film Board of Canada

Film Digest:
The population explosion and its dangers to the people of the world is explained. How world population had been controlled in the past and, by comparison, the tremendous uncontrolled growth of the last quarter century is illustrated.

With the increase in the life span of man and the population explosion have come many new problems such as noise, congestion, shortage of living space, inadequate food supplies and educational facilities, crime increase, traffic problems, and the complex urban sprawl.

The film proposes some possible solutions to the problem through such processes as mass migrations of people, finding new sources of wealth and resources, new methods of producing more food, and controlling population by war, disaster and pestilence.

Film Concepts:
1. The growth rate is fantastic and is largely due to man's own achievements.
2. People live longer and prolonged life creates many other problems.
3. Population in the past has been controlled by various natural reasons.
4. Prosperous countries are fairly well fed and housed but are having other problems as a result of the population growth.
5. Increased population has caused congestion in the cities of the world.
6. We need more food and more sources for food.
7. We need to take steps to control the population growth.

Vocabulary:
locusts
bubonic plague
epidemic
charlatan
lunatic
innoculation
hygiene
tetze fly
congestion
pestilence

Provocative Questions:
1. How serious is the population growth problem?
2. Are billions of people outstripping the world's ability to provide the basic needs for life?
3. Are the billions of people hurting our social, emotional, mental, and physical development?
4. How should we, if we could, control the world's population?

Program No. 2
Process Series No. 2
Master Teacher - Lloyd Kornmann

Concepts Emphasized:

1. The population and the rate of growth are growing at an alarming rate.
2. There are enough resources if we conserve and use them properly.
3. Substitutes for our crucial minerals are available in great quantity.
4. New ways are being found to mine, refine and use our natural resources.
5. To develop buying power we need jobs and to create jobs takes money.
6. We need to cut down on the birthrate by family planning.

Strategies Demonstrated:

To teach critical, reflective thinking through recognizing or identifying central issues, recognizing underlying assumptions because arguments are based on assumptions, evaluating the evidence and drawing warranted conclusions.

First, the strategy will be applied to the question of population growth. The central idea, that people are multiplying too fast, is identified. The assumption is that numbers will continue to grow unless checked. Data or facts may be checked and interpreted to give us a warranted conclusion that there will soon be too many people unless some measures are undertaken now.

Second, the strategy will be applied to the problem of natural resources. Will the supply run out? The assumption can be made that it will unless we learn to control, substitute or reclaim resources in a more efficient way. Evaluating the evidence on reserves of various kinds we find it impossible to get an accurate picture. Consequently, one can draw the conclusion that presently we can't be sure of actual reserve potential.

Third, we will look at electrical power resources. Some countries are not using their full potential for producing this power. We can assume they can find better and more ways to use it. It accounts, in part, for their lack of industrial might. If we evaluate to find out why, lack of money may be one reason. If money were provided could we conclude that greater industrialization would take place?

Fourth, some mineral resources are located in odd, difficult places of the world. One can assume they would be expensive to reach and extract. If one evaluates the cost of obtaining these versus the value of the resource a conclusion can be drawn as to whether it is worth the effort to find a cheap way to obtain the mineral.

Program No. 2
Inservice Series No. 2
Master Teacher - Lloyd Kornmann

## Interpretation and Discussion of Strategies

Reflective, critical thinking will be defined as conceived by the American Council on Education. Isidore Starr's explanation of how it works will be used and implications about its value in life will be noted. A comparison of reflective thinking with the traditional methods of learning, pointing to the values of reflective thinking as conceived by various social scientists will be made. Problems of using this method effectively are noted.

Research evidence is reviewed. Narrative inquiry which differs from the expository method is discussed. A report on the skills and content gained by reflective thinking is given. Support for the learning process of reflective thinking versus mechanical or traditional methods is presented.

Application to the classroom is made by illustrating situations in a mathematics class and in the social studies. Such thinking processes may center on the study of one item or fact in depth; may be used to explore developments or new systems; or may be used for undertaking comparative studies. The method of asking good questions will be considered. Such factors as why do you ask questions a certain way, how does one get a good evaluation, how do we make good assumptions, how do we state theories, and how do we come up with good conclusions will be discussed.

Program No. 3
Content Series No. 3
Master Teacher - Lloyd Kornmann

**Thematic Subtopic:**
In Search Of Space For Controlling The Population Explosion

**Film:**
THE GLOBAL STRUGGLE FOR FOOD 28 min., 16mm, snd., b&w, National Film Board of Canada

**Film Digest:**

The movie explains the hunger problem. It interweaves this with the population explosion problem. An historical perspective is given starting with World War II. You get a feeling of urgency!

Implications and possible ways of solving the food shortage problem are mentioned. Specifically illustrated are the problems of water supply and control, use of better tools, education, more scientific agricultural methods and wiser uses of land and water resources.

Some time is devoted to solutions not directly related to food production such as increased power production for industrial expansion, transportation problems, storage, and creating jobs to increase purchasing power.

**Film Concepts:**

1. The food shortage problem could get worse.
2. World War II triggered an intense need for food.
3. Flooding is affecting the world's ability to produce food.
4. Human energy is abundant in many of the countries.
5. The shortage of water is a major problem to the under-developed countries.
6. Better implements are needed.
7. Better farm educational programs are needed.
8. More research is needed in the under-developed countries.
9. More education and better medical programs are needed.
10. Better transportation is needed.

**Vocabulary:**

acute
collective farms
implements
scythe
legumes
depleted
insecticides
fungicides
arid

**Provocative Questions:**

1. What is our role in aiding the under-developed countries?
2. What if man doesn't solve the *Global Struggle For Food*?
3. Is it possible to solve the *Global Struggle For Food*?
4. If so, how is it possible to solve the *Global Struggle For Food*?

Program No. 3
Process Series No. 3
Master Teacher - Lloyd Kornmann

Concepts Emphasized:

1. One-half of the world's population is undernourished now and the situation could get worse.
2. Nature has held the population growth down in the past but also has contributed to the food shortage.
3. We know methods to solve the food shortage if we can only develop them.
4. Food shortage affects other aspects of life such as productivity and life expectancy.
5. In most cases mechanical power can do a better job than hand labor of farmers.
6. Insects do a tremendous amount of damage during and after the food has been raised.
7. The ocean is a vast untapped storehouse for food supply.
8. Improved preservation techniques of food could help immeasurably.
9. Cultural changes could also help to solve the food problem.

Strategies Demonstrated:

The use of producing uncommon, clever, or remote responses: shift attack and use objects in a new way; change the item to meet new conditions; change in any direction because of no restrictions; recognize practical problems in creating solutions.

The major problems for consideration will be:

1. What if man doesn't solve the global struggle for food? This supplies ample opportunities for creative thoughts in any one of the realms of creative thinking mentioned above.

2. Is it possible to solve the food shortage?

3. How would you solve the problem of introducing mechanization in the under-developed countries? The more insight one has into the problem in the various countries the better he might be able to contribute some valuable creative suggestion for solving the mechanization problem.

4. How can you control the insect problem?

5. The world has a variety of soils and climates that make for a wide variety of growing conditions. Can creative thinking be used in developing new and better seeds that might solve, at least partially, the global struggle for food?

6. Some areas are short of water. Can you think of ways that might make it possible to raise food without so much water?

7. The ocean is rich in fish as well as other edible foods. Can you think of ways to increase production?

8. Much of the food supply spoils in the under-developed countries. Can you think of better ways to prevent this from happening?

9. Education is considered very vital in improving the supply of food for the undernourished people. How would you go about educating people so that they could take advantage of all the scientific data already available?

Program No. 3
Inservice Series No. 3
Master Teacher - Lloyd Kornmann

## Interpretation and Discussion of Strategies

We will examine the concepts of creative thinking as viewed by many of the learned men in the field. The range of opinions on creative thinking will fall into the general area of producing uncommon, clever, or remote responses: taking known ideas and using them in new ways; changing something already known to meet new conditions; changing without any confinement on the change; and last, the role of practicality in being creative.

We will look at the research done on the four-stage creative process of preparation, incubation, illumination, and verification. In addition, we will see what has been done in transferring these processes from the classroom to the industrial world. The degree of creativity in all people will be noted. Creativity of the individual versus productivity in groups will be reported on.

Illustrations of classroom applications will be made in the science class, the industrial arts class, the English class and in social studies. Emphasis will be made on the potentiality for creative productivity.

Program No. 4
Content Series No. 4
Master Teacher - Judith Tidemann

Thematic Subtopic:
In Search Of Space For Controlling The Population Explosion

Film:
THE CITY AND THE FUTURE 28min., 16mm, snd., b&w, National Film Board of Canada

Film Digest:

Lewis Mumford seeks to show that the big city has become the center of the congested metropolis. Man has allowed this to happen. There are many who are asking "does it really matter?" Complex situations are bringing action on this problem. Many are seeking to bring the benefits and good features of living in big cities back to the people.

Suburbs create problems for the cities because they lack the real capacity for centralizing activities. Big city emphasis must be on the human environment; the indoor-outdoor aspects of community living. Can the suburbs and the big cities serve their population in this manner effectively?

Transportation problems of the metropolis need to be resolved. The growth of public transportation must be coordinated with regional growth. The automobile will need to be replaced in some areas with the extended use of mass transportation systems like subways, high-speed trains, or the monorail.

The city will not disappear. The heart of the city gives that which will invigorate and sustain man. The city offers man a choice in its cosmopolitan atmosphere. Despite the fact that the city has so much to offer man it continually needs renewal in many areas. This is the challenge for the man of the future. Will the city continue as the center of a metropolitan area or will we allow it to degenerate?

This film does not show what cities will be like in the future as the title may suggest. It simply shows what a viable city of the future will need to maintain itself. As the students view the film they should be reminded to think of their hometown and what it needs to exist in the future.

Vocabulary:
metropolis
megalapolis
affluence

Program No. 4
Process Series No. 4
Master Teacher - Judith Tidemann

Concepts Emphasized:

In sixty years the population of the world will have doubled, and these new millions will live mainly in urban areas. The cities of today are not able to contain such a situation indefinitely. How can we, then, meet this problem?

An ideal city must become a vision for us, and we must work to make this vision a reality. This vision is now fragmentary, and we must put the pieces together into a civilization based on the machine. The city is man's greatest invention, and the future city must arise from the old as an extension of the old spirit.

Ancient empires and cities teach many lessons to 20th century residents. The rise and demise of these past cities often-times gives us analogies to our life in the present.

The metropolis of today is defined so that we have a common point of reference. The same is done with the megalapolis of the future.

Man functions at his best within the city for there he can find an identity and make a choice of the kind of life he desires. One choice is to rehabilitate the old city center to guarantee the good life for individuals, families, and groups.

Man could move to satellite or regional towns. Such developments have had the greatest success in England and Sweden. They are aimed at controlling the growth of metropolitan areas. These areas are planned laboratories of urban design, architecture, traffic management, and social engineering. In the United States new towns have been plagued by problems of poor management, bankruptcy, and lack of industrial interest. The United States can learn much from England and Sweden.

A third choice for us is to permit the present urban sprawl pattern to go unchecked. We can make the richest country in the world the ugliest or we can shape an environment worthy of man.

Strategies Demonstrated:

Problem-solving through recognition of a problem: analyzing the problem; suggesting possible solutions; testing consequences; and making judgement on possible solutions.

Paradoxes: situations opposed to common sense but true in fact; inconsistencies between things people hold as true.

Analogies: pointing up new information or principles by looking at similar situations in terms of things students already know.

Allowing for thinking about possibles: making guesses, or hypothesizing.

Program No. 4
Inservice Series No. 4
Master Teacher - Judith Tidemann

## Interpretation and Discussion of Strategies

The process lesson in this series looked at the many problems of our cities as they move into the future. This program seeks to show ways in which the students, as decision-makers of the future, will be able to work in the classroom in a workshop environment.

In looking at the many problems of the city it is easy for us to stand idly by. This is not possible. We need to encourage the students to become active participants in developing the city of today into a truly viable metropolitan center in which they can live tomorrow.

Many models for developing the study of the city are suggested, all focusing on the use of the technique of problem-solving. The paradox of city life in an affluent society or the paradox of government action or inaction are good ways to begin. Cities of the past and present allow us to work with the model of an analogy.

What general or specific problems are of interest to the members of the group? Some suggestions are given including: use of leisure time; transportation systems; crime and law enforcement; housing; education; metropolitan governments; the place of cultural activities; the fine arts; air and water pollution; occupations available in the city; public services.

Another way to pursue the study of cities is to look at the roles and responsibilities of mayors. New York City, Chicago, Cleveland, Atlanta, Detroit, Los Angeles, or Philadelphia have mayors who have reached national prominence. Ample resources are available on the study of their unique roles.

How does one pursue these studies? I suggest an interdisciplinary approach using social studies, science, mathematics, and art in an individual or group study. I make many suggestions for resources ranging from phonograph records to detailed accounts of research. Each group will have to work according to interests and abilities.

What is the rationale behind this type of study? Since we expect these able and gifted students will be making many of the decisions in their communities in the future why not allow them such practice in the classroom today. Guidance is needed when they are taking chances and meeting situations which present the case of, "what if." All planning and decision-making experiences they have today will have a profound effect on their lives tomorrow.

Program No. 4
Master Teacher - Judith Tidemann

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Program No. 5
Content Series No. 5
Master Teacher - Judith Tidemann

Thematic Subtopic:
In Search Of Space For Controlling The Population Explosion

Film:
ACHIEVEMENT IN HONG KONG 15 min., 16mm, snd., b&w, International Film Bureau

Film Digest and Concepts:
We cannot allow many additional millions to inhabit the space on this earth. Since this is more of a problem in Asia, we in the United States can see what may happen to us if plans are not made to take care of future growth. We are not isolated from the other parts of the world so we must concern ourselves with such problems.

Life in the urban areas of the world is another problem. We in the United States are right in the midst of this situation since 70% of our population now resides in urban areas. The world figure is 50%. The city needs a coordinated effort to insure that it will survive as the center of the metropolitan area.

Great stress is placed on the ways in which people come to realize that a change is necessary. Education is one way of doing this. The demonstration method is another way and is best illustrated in the Hong Kong situation.

The film, "Achievement in Hong Kong," shows how the demonstration method worked in alleviating the extreme population crisis on the island among the refugee Chinese from Red China. These peoples had come to Hong Kong because of the rise of the Communists under Mao-Tse Tung in their homeland. A good background is given about life in Hong Kong. You get an excellent view of life in the refugee section of the island. Stress is placed on the fact that Hong Kong has been under strict rule, but the Chinese have been allowed to live as they choose.

It was a tragedy in 1953, a fire, which necessitated a change. What did this change do to a people who had known only one way of life over the centuries?

The first four programs in these telecasts gave you an overview of problems dealing with population, urban sprawl, food resources, and the city. Students will be helped to think about these four problems and see how the Hong Kong demonstration teaches a lesson to the people of the world on a possible way to resolve part of these problems.

Vocabulary
resettlement serendipity

Program No. 5
Process Series No. 5
Master Teacher - Judith Tidemann

## Concepts Emphasized and Strategies Demonstrated:

What is Hong Kong and why do the Chinese Communists allow it to exist as a free port only 91 miles from its great metropolitan city of Canton? There is great economic wealth in Hong Kong for the Red Chinese Government; $700 million in yearly profits.

What does Hong Kong offer the Chinese who come to the island in such great numbers?

How do people learn a lesson? The demonstration method is seen as one of the best ways to learn a lesson. In this way we learn by example. The method helps to show that there can be a better way of living.

This better way of living comes about by using resettlement. Many examples are given of resettlement from past history. What happens to people who must be moved from their homes? This concept is brought to a local situation for the students with the analogy of highway construction.

Much discussion centers on change. Change is not necessarily always progress. It is important that the students see and understand where change has occurred in daily life. Many parts of life that are taken for granted by the students have really been established by a long process of change. Where do the students wish to see changes affected in their daily lives? What will have to be done before such can come about? Do they wish to have some traditions continued? If so, how does one go about this process?

We refer to habit. What is habit, and why is it difficult to break? People are creatures of habit. Some aspects of our lives are governed by habit.

Some times we meet success by failure or accident. This is known as serendipity. Examples are made to show this concept. When the students come to realize that failure can teach a lesson they will then be more willing to work in situations where the conclusion may be open-ended. They will then dare to take a chance on new ideas. It is possible then to pose questions of "what if." They are willing to hypothesize on the possibilities for change.

Program No. 5
Inservice Series No. 5
Master Teacher - Judith Tidemann

## Interpretation and Discussion of Strategies

Our students are the decision-makers of tomorrow. One way in which they can have practice in making decisions is in classroom activities. Teaching should aim at developing thinking that is productive.

Four specific models were used in the process program with the students. These models dealt with the process of change, breaking of habits and rigidities, adjustment to situations, and "what if" situations with open-ended possibilities.

It is possible for the teacher to take these and any of the other models as suggested by Dr. Frank Williams in "Perspective of a Model for Developing Creative Behavior in the Classroom" and adapt them to basic subject matter content to develop thinking that is productive and creative. The teacher is also then using methods that are creative.

The example of change in the Hong Kong situation can be readily adapted to other aspects of life where dramatic changes have been affected.

Resettlement will have to be more fully discussed with the group in light of experiences of the individuals. Personal examples from group members, if possible, can be more meaningful than those suggested in the process program. Another hypothetical situation could also be used depending on a local problem.

Discussion with regard to habits can be most fruitful if the group can objectively look at our society with its many rigidities. The teacher will have to give much direction in such a situation so that the very tradition or habit-bound individuals do not develop great anxieties. It is good to ask questions on habits in all areas of life.

In challenging students to attempt difficult tasks we are preparing them for future life when it will be necessary for them to take chances in the solving of problems. We will have to alert them to the success-orientation of our society so that they know how difficult life can be for them in this complex society if they come up with a discovery.

A few suggestions are given of selections in language arts and social studies in which the models can be applied.

Program No. 6
Content Series No. 6
Master Teacher - Charles Burnside

**Thematic Subtopic:**
In Search Of Space For Solving Transportation

**Film:**
WHY EXPLORE SPACE? 19 min., 16mm, snd., b&w, Dimension Films Inc.

**Film Digest:**

This is a thought provoking film which raises questions in both the physical and social sciences. What are the values of space research? How does it relate to world problems? What are the goals of science? How will new knowledge change your life?

The theme of the film is brought to life through a superbly documented historic event: the flight of John Glenn, first American to circle the earth in space.

**Vocabulary:**

- space medicine
- evolution
- constellation
- miles per minute
- Orion

**Bibliography:**

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Program No. 6
Process Series No. 6
Master Teacher - Charles Burnside

**Concepts Emphasized:**

**At present highly trained astronauts can travel in space, primarily for the purposes of exploration and experimentation.** These experiences are providing valuable information in the areas of physical science, medical science, weather prediction and control, and psychology. To be a contributing part of the space age we will need more specialized and longer educational programs.

Man is a curious being. He will explore and study, because he wants to know. In our activities we often meet with conflicting information and ideas. It is man who, on the basis of his past experience, must judge each thing to be good or bad, valuable or worthless, and beautiful or ugly.

There is a difference between wasted effort and money, and invested effort and money. Investments answer our questions and make us more capable of coping with the trials of the future. Investments (taking a chance) in learning and exploration, as in the economy, are not always 100% safe, but without chance taking there is no progress.

Strategies Demonstrated:

An ambiguous situation is created. The students are a party to the gathering of information which creates this situation. Through the evaluation of this ambiguity we examine the curiosity of man and his desire to learn through study, exploration and experimentation even when this means taking risks. The willingness to take risks leads us to points in history and in personal life where risk taking was or is the only road to progress.

Materials:

(For students viewing the program) paper, pens or pencils, comfortable writing conditions.

Program No. 6
Inservice Series No. 6
Master Teacher - Charles Burnside

## Interpretation and Discussion of Strategies

There is more content (product) in existence today than can be taught to even the most gifted student. According to Dr. Frank Williams there are basically seven divergent thinking processes. These processes can be developed in the gifted learner by using certain teaching strategies or devices. When these abilities are developed the learner is capable of handling many more situations than it is physically or theoretically possible to directly teach him about. This is why men like John Dewey, E. Paul Torrance and Frank Williams, have continued our interest in problem-solving behavior and the divergent processes which lead to this behavior.

Dr. Torrance has developed many ideas for the testing of creative behavior in children and adults. His ideas and techniques are truly original and effective. One item he uses pertains to the alternative uses of a tin can. He has illustrated that with items like this one the trained observer can stimulate and evaluate the presence or growth of fluency, flexibility, willingness to take risks, elaboration, preference for complexity, and originality.

We know far too little about creativity. However, the results of Dr. Torrance's research should provide some of the empirical evidence needed to make educators more aware of the delight in teaching for creative behavior.

Creative divergent thinking behavior can be developed with your students by the use of ideas used in Program 6, such as teaching for flexibility by the use of ambiguities. Most social situations are ambiguous in varying degrees. With your students try to create ambiguous situations, then try to lead them to the point of evaluating and respecting both sides of the situation.

Materials:
Paper, pens or pencils, comfortable writing conditions.

Bibliography:

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Beittel, K. R. and Burkhart, R. C., "Strategies of Divergent, Spontaneous and Academic Art Students," Studies in Art Education, Vol. 5, 1963, pp. 20-29.

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Program No. 7
Content Series No. 7
Master Teacher - Charles Burnside

Thematic Subtopic:
In Search Of Space For Solving Transportation Problems

Film:
EXPLORING BY SATELLITE 30 min., 16mm, snd., b&w, Central Scientific Company

Film Digest:

This is a film uniquely documenting the United States satellite program. Graphic animation illustrates the physical laws that control satellite orbit. Actual footage shows construction, testing, launching, and tracking of satellites. This presentation reveals the contributions of the program to science as satellites explore new frontiers in space.

Vocabulary:

orbital decay
trajectory
apogee
perigee
tangent
gantry
template
micrometeorite
thermister
Lyman alpha
gyroscope

Provocative Questions:

Questions such as these may be of interest: Why was the satellite program needed? What are scientists learning from the space program? What is the gaseous composition of the various strata of the earth's atmosphere? What keeps the satellite in orbit? What prevents the satellite from orbiting in a perfect circle around the earth? Why is the use of satellites so important to mankind?

Reference:

Materials are available by writing directly to NASA - National Aeronautics and Space Administration. In a letter, simply describe the type of materials you would like to receive and the purpose to which they will be put.

Program No. 7
Process Series No. 7
Master Teacher - Charles Burnside

Concepts Emphasized:

After a review of the major space accomplishments since 1958, the International Geophysical Year, we discuss some of the important factual material related to placing an earth satellite in orbit. Ideas such as fuel consumption, production of power, flight stability, atmospheric conditions, and the balance created between gravity and the motion of the satellite are mentioned.

Throughout this film, the students are asked to hypothesize future developments in space travel and space living. They are lead into situations which enable them to envision themselves traveling or living on another planet. Questions relating to the reasons for earth men living on other planets are developed.

Strategies Demonstrated:

In order to develop skill in flexible thinking five strategies are used. They are: Use of analogies between growth in air travel and expected growth in space travel; sensing deficiencies in man's ability to put theory into practice; thinking of possible changes to come in the students' own lives; citing examples of change; (this is tied to the space travel analogy) and visualization through imagination.

Each of these strategies contributes to the student's ability to be flexible in thinking about his role in the 21st century. An understanding of pertinent subject matter as we relate to changes which are expected to evolve is essential.

Program No. 7
Inservice Series No. 7
Master Teacher - Charles Burnside

## Interpretation and Discussion of Strategies

High levels of productive-divergent thinking are evident in the very creative students. Psychologists like Dr. E. Paul Torrance and Dr. Frank Williams believe that we can increase the level of productive-divergent thinking in students, especially the most able.

Divergence need not oppose convergence. If the student diverges as he searches for alternative solutions to a difficult question he is more apt to converge upon the question with an answer then is one who merely converges before using divergent thinking skills.

The 23 teaching strategies of William's model of productive-divergent thinking are discussed in considerable detail in this film. Examples are used to indicate how each strategy might be used by the teacher. They are also detailed in another section of this syllabus.

Bibliography:

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Program No. 8
Content Series No. 8
Master Teacher - Charles Burnside

Thematic Subtopic:
In Search Of Space For Implementing New Communication Systems

Film:
COMMUNICATION AND THE COMMUNITY 16 min., 16mm, snd., b&w, Dimension Films Inc.

Film Concepts:
Communication systems tie a community together and link it to the rest of the world. In fact, communication systems make interdependence possible.

Film Digest:
Weather information reports warn the community that a wind storm is coming. Missing the warning, a farmer begins burning off his field. The fire, whipped by the strong winds, spreads beyond his control. By radio and direct-line telephone, the fire warning flashes to police and fire headquarters. The Fire Captain communicates with fire fighters. An observing heliocopter radios warnings that the fire may spread to nearby homes. Community emergency services are alerted. A mobile fire truck sets up its apparatus for wind-readings near the fire. News media keep an anxious community informed.

Vocabulary:
electric megaphone
closed-circuit television
radio-sound balloon
facsimile

Program No. 8
Process Series No. 8
Master Teacher - Charles Burnside

Concepts Emphasized:

Man's ability to communicate effectively has been evolving for million of years. This ability, along with the tools of communication, will continue to develop in complexity for many more millions of years. Currently we know of three major forms of communication; gesture, spoken and written. All present equipment and techniques seem to fit into one or more of these categories. However, based upon past records of communication developments, there is reason to assume that other more complex techniques, or even other simple basic forms of communication will develop. Extra sensory perception (E.S.P.) could be an example of this. If, in our thinking, we remain flexible, we are more apt to bridge the gap to accepting and applying new ways of thinking about communication.

While we are thinking about future forms of communication it is important that we work for the more effective use and refinement of our present techniques and equipment for communication. The need for effective communication points directly to the evolution of man's interdependence with his fellow man which feeds, clothes, and shelters us. It has moved man into the age of the computer.

Strategies Demonstrated:

The use of examples of change is used throughout this program by having the students recall and sometimes list examples of old, new and future techniques and types of equipment for communication. This strategy is not only used to better develop our understanding of the concept of communication, but also to demonstrate the powers of fluent and original thinking. We see from this program's discussion that fluency of thought is also a skill which adds interest to the learning process and demonstrates understanding in many situations. These are types of thinking particularly appropriate for the gifted child.

Program No. 8
Inservice Series No. 8
Master Teacher - Charles Burnside

## Interpretation and Discussion of Strategies

Learning is not independent of the things which happen around the learner. Three variables; the student, the task to be learned and the environment contribute to any learning situations. Each of these variables is composed of sub-variables. The experimental laboratory is the only place where we approach the control of these variables. However, the teacher can manipulate these variables in a way which makes the task appropriate in terms of the learner's ability, experience and interests as well as in terms of environmental conditions.

Men like Pavlov, Skinner, and others have made it possible to better understand why learning takes place. We find cause and effect relationships which are worth while considerations in the classroom situation. Giving attention to these considerations makes the important task of helping students to understand "concepts" much more likely of meeting with success.

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## THE INTRODUCTION TO THE THREE FILMS IN
## Programs 9, 10 and 11
## Films: Man Alive, The First Mile Up, On Prescription Only

This introduction to the three films in series 9, 10, and 11 is developed in order to unify the content of what are essentially three different subjects: The World Health Organization, pollution of the atmosphere, and the progress made in the pharmaceutical industry.

Through a series of questions, I try to get the students to view the films as part of a continuous theme running through each of the films which is concern for man, his physical needs, and the technological progress he has accomplished. What is missing from the films is a concern for man's spiritual and intellectual needs such as poetry, music, drama, philosophy, and social science. Because there has been a heavy emphasis put on the Physical and Life Sciences in our school curriculum to the deprivation of the Social Sciences and Humanities, I think we need to shift the thinking of the students to correct this imbalance. By analogy and paradox, I attempt to help the student infer that these human qualities and necessities are omitted but need to be accounted for.

It is my intention to introduce the films to the students with the inference that all of man's progress is debatable if his basic human needs; to think, solve problems, and liberate himself from ignorance, is neglected. I suggest a framework in which the students should view the films which I call a strategy for thinking. Six steps for the strategy for thinking for students to use are listed and described. (1) Start with a problem--in this case, it was to be concerned about man, his problems, and how man determines he has a problem. (2) Use the information you have, plus what you get out of the films. (3) Reason by analogy. (4) Sort out similarities and differences. (5) Project a hypothesis. (6) Be ready to support the hypothesis or reject it. Each of these steps will be repeated on different, increasingly more complex levels from film to film.

Preparation Suggested:

It would be helpful if the student has some understanding of the role and responsibilities of a scientist, a humanist, a philosopher, a social scientist, an economist and an artist. This will aid him in his evaluation of social problems, how they are solved, and what teams of experts are most appropriate.

Since the role of chemistry, physics, and biology are so highly valued in American education today, some emphasis is needed in the humanities to correct this imbalance. In fact, the entire question of individual and social responsibility for what is created, either by the scientist or the artist, should be open for discussion by the students at some time.

Program No. 9
Content Series No. 9
Master Teacher - Bella Kranz

Thematic Subtopic:
In Search Of Health For Nuturing Mans' Health

Film:
MAN ALIVE 25 min., 16mm, snd., b&w, Contempory Films, Inc.

Film Digest:

This film is sponsored by the United Nations and attempts to show the importance of the work of the World Health Organization (WHO). As the camera moves across India, Egypt, and some of the African nations, the viewer gets a vivid picture of how specific diseases affect these people, especially their children. With some simple solutions available to men today many of such contagious diseases as tuberculosis, cholera, yaws, meningitis, malaria, trachoma, elephantiasis and leprosy could be eliminated or contained.

The problem of hygiene, unpolluted water and knowledge about nutrition is disseminated by WHO. Thus it contributes to the welfare of these under-developed nations. Through WHO training of skilled and professional people it is possible to transmit information on health to all in every village, no matter how primitive. It is through the efforts of WHO that knowledge removes the yoke of a crippling or a short-lived existence for these people.

By rendering services and knowledge about the improvement of human health, WHO serves all mankind and provides its recipients with the most recent scientific benefits. It disseminates information and health services to more economically advanced countries where people can benefit from such efforts. Contemporary civilizations with its concomitants; heart disease, cancer and mental disease, needs the research and advanced services of WHO, too.

Preparation Suggested:

There are a number of allusions to Greek mythology in this lesson because it offers such a rich, imaginative set of symbols for analogous thinking. Students should be familiar with the story of Prometheus, Hercules, and some of the characteristics of ancient Greek beliefs and customs before they view the film if possible.

When viewing students should have at hand a pencil and scratch paper to jot down their questions and suggestions.

Vocabulary:

complacent
contagion
scourage
contaminated
potential
trachoma
elephantiasis
malaria
yaws
tuberculosis
bacillus
cholera
meningitis
penicillin
sulphur
leprosy

Program No. 9
Process Series No. 9
Master Teacher - Bella Kranz

Concepts Emphasized and Strategies Demonstrated:

The students are invited to consider what is meant by a philosophy or theory of progress. To determine when man fosters progress and when he hinders it, it is necessary to analyze the inherent properties of progress. By stressing the analysis of the inherent properties of any phenomenon we are teaching students to break things down into their component parts in order to better understand the whole. Through a series of evaluative-type questions, I ask the students to develop a set of standards of their own by which to measure progress.

The notion of a paradox is used in order to illustrate how difficult a simple definition of progress can be. Through several examples of situations opposed to common sense but true in fact, I provide opportunities for the student to list some paradoxes he saw from the film "Man Alive."

Thinking by analogy is introduced in order to make the learner aware of how we may discover new information, facts, or principles by looking at similar situations in terms of things he already knows. I use the visual analogy of a chess board. By moving the king and queen around on the chess board, I illustrate intellectual analogies from history--e.g., Greece, feudalism, modern capitalism. I try to combine visual, auditory, and intellectual analogies, because this helps the capable learner make inferences more vividly and efficiently.

How a student proceeds to support his judgements are crucial to whether anyone will listen to his arguments. For this reason, I refer to the consequences of the actions of students who use rude tactics as compared to those who use diplomatic tactics.

A discussion of a theory of progress will be helpful in evaluating the subsequent lessons. Helping the students evaluate time lines on which historical events, scientific achievements, famous men and their contributions are seen as an ever upward-moving spiral may help the youngsters define a theory of progress. However, the teacher should be a constant "devil's advocate" for encouraging students to see paradoxes and to draw analogies.

Program No. 9
Inservice Series No. 9
Master Teacher - Bella Kranz

## Interpretation and Discussion of Strategies

In the introduction to the three films on the subtopic theme, In Search of Health for Nurturing Mans' Health, it was my concern to make you aware that the films cover three different subjects. Teachers need to look for big themes within a collection of facts that they are often required to teach. This thematic approach enables the teacher to focus on concepts, rather than on individual items of data. In this respect I am influenced by the work of Jerome Bruner in which he refers to a "spiral curriculum." Specifically he is concerned with broadening the conceptualization of the learner. Two of his books that deal with this are: Process of Education and On Knowing: Essays for the Left Hand.

Raising questions with the students so that they may learn how to make inferences and in this way multiply their chances to discover new relationships or gaps in their knowledge is an important learning process. If you want youngsters to make inferences and discover new relationships teachers need to provide time for this. Frank Williams of Macalester College suggests that teachers provide a "pigeon loft" in the school or classroom where a student can go to wonder.

In looking for analogies it is helpful to provide several graphic or visual opportunities for comparing. I use a chess set for comparing the pawns to serfs, slaves, or laborers, and the king-piece for comparison with feudal kings or greek rulers. These same visual objects may be used to compare differences. By helping youngsters see differences and likenesses we help them polish their art of inquiry. More information on the productive thinking which results from inquiry training may be learned by reading Richard Suchman's "Inquiry Training in the Elementary School" Science Teacher 27:7:42-47, Nov. 1960.

Looking for the inherent properties of objects or ideas is another strategy for productive thinking. We must assume that the gifted child has accumulated a great deal of factual tid-bits because of his characteristic voracious reading habits. We should help him occasionally shift to an examination of the data already accumulated.

I also refer to rigid thinking. One of the activities which builds a strategy for critical thinking is to evaluate the commonplace homilies youngsters use and hear all the time, e.g. ignorance is bliss.

I help the youngsters fit their new cognitive strategies into their development of a theory of progress. As the students make tentative hypothesis, change it, or cause it to be altogether rejected. A good reference for this cognitive development with gifted students may be found in James J. Gallagher's Teaching the Gifted Child.

Program No. 10
Content Series No. 10
Master Teacher - Bella Kranz

Thematic Subtopic:
In Search Of Health For Nuturing Mans' Health

Film:
FIRST MILE UP 27½ min., 16mm, snd., b&w, National Film Board of Canada

Film Digest:

The vast amounts of industrial wastes produced by a highly developed technology is creating an atmosphere which is fast approaching lethal levels of pollution. Concern for the physical discomforts of the inhabitants has prompted various municipalities to curb pollution of the air to some degree. In cities like Detroit; Windsor, Ontario; and Los Angles laws have been instituted against burning trash, putting smog devices on cars, and capturing some industrial wastes through filters. These devices, however, have not been very successful in reducing the amounts of pollution in the atmosphere.

There is still a great deal about the nature of the air hovering over a city of which we know very little. Other dangerous particles in this polluted air may be causing not only superficial discomforts like smarting eyes and irritated noses and throats, but also respiratory illnesses of a more serious nature.

In an interview with Dr. Linus Pauling it was learned that as little as two roentgens of X radiation may cause the pre-mature death of an unborn child. This example is especially important if fall-out from atomic bomb testing is considered. This added pollution of the atmosphere increases the danger to life today and for unborn generations.

While man can survive five weeks without food or five days without water, he cannot last five minutes without air. Nevertheless our civilization is causing the air to be contaminated in ever greater doses. A solution for this problem must be found soon.

Preparation Suggested:

Students should have a pencil and paper ready to work as suggestions are made.

Vocabulary:

ionosphere
stratosphere
perimeter
roentgens
debris
lethal
topic
abatement
genetic

Program No. 10
Process Series No. 10
Master Teacher - Bella Kranz

Concepts Emphasized and Strategies Demonstrated:

By studying contrasts I try to help the learner find the similarities and differences between two contemporary societies: a primitive African society as seen in an earlier film "Man Alive" and a modern American-Canadian society as seen in "The First Mile Up." The learner will discover elements of backwardness in each society. The idea of learning from dissimilar situations is a fruitful strategy for thinking. The student will become aware of the advantages of a simple village life as compared to a stress-induced, fast-paced civilization. He is shown how to extrapolate from each of these situations which elements are desirable. It should begin to become clear that by extrapolating information and tinkering with ideas he may reach a conclusion he didn't believe possible a week ago, a month ago, or a year ago.

The student is given an opportunity to hypothesize about some possibilities that a make-believe primitive civilization could pursue today. For instance, he is asked: is it possible for a primitive civilization to develop technologically without making the mistakes we have made, e.g., pollution, war, exploitation of land, men, etc? How would this be possible?

Learning from mistakes or deficiencies in thinking is another strategy which is very productive for creative and flexible thinking. There are many examples where someone made a mistake and something marvelous resulted. There are other examples where people made mistakes because of intellectual or technological limitations of the days in which they lived. It is suggested that the student hypothesize or conjecture as to how he would have built an automobile without creating an exhaust problem, for example.

Paradoxes are used in order to explore the remedies we use, not only for pollution but other social problems like poverty, war and discrimination. A careful and extended treatment of the paradox in palliatives or solutions is explored. To help the learner in his cognitive journey of exploration, I urge him to consider very strongly what is not known; what is not being done; what is missing, rather than what is known, etc.

Program No. 10
Inservice Series No. 10
Master Teacher - Bella Kranz

## Interpretation and Discussion of Strategies

I am concerned that the learner dare to take intellectual risks and, therefore, I urge the learner in the process film to hypothesize, "imagine if....," and "suppose that....." This strategy for thinking helps the learner become more divergent in his cognitive patterns. Divergent thinking is a strategy which helps the learner to realize his intellectual strength by permitting him to come to a unique conclusion which may be a solution for an age-old unsolved problem of man. Paul Torrance in his book Guiding Creative Talent has described some of the attitudes teachers should adopt in order to create a responsive learning environment for divergent thinking.

I illustrate how to frame evaluative types of questions as well as divergent kinds. In using divergent and evaluative strategies for thinking the student has to consider the consequences of his choices. He has to think: "If I take this position, this and that follows." Therefore, I am able to introduce the student to still another strategy for problem solving and this is cause and effect.

I suggest that teachers refrain from evaluating students in all their cognitive activities. There is a great tendency today for the self-fulfilling prophecy about working for grades to be operative. I, however, raise the possibility, that students learn for intrinsic reasons more than extrinsic ones if we structure the curriculum in terms of problem-solving, cognitive techniques.

I talk about enhancing the self-esteem of your gifted students who have a very inaccurate appraisal of their intellectual strengths. Their self-esteem is correspondingly lower than one would expect of such children. Along with developing self-esteem, I suggest we aim for developing the self-actualization of gifted learners. A self-actualized person, as described and analyzed by A. H. Maslow in A Theory of Human Motivation is a person who; (1) is committed to his work, (2) has self acceptance, (3) has a tolerance for uncertainty, (4) is realistic and (5) is appreciative of the beauties in life.

If we want to expand the learner's conceptual awareness, we should try to introduce different cognitive processes. I use three; learning from deficiencies, learning by analogy and learning by using paradoxes. You may get more information about each of these learning processes by reading:

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Program No. 11
Content Series No. 11
Master Teacher - Bella Kranz

Thematic Subtopic:
In Search Of Health For Nuturing Man's Health

Film:
ON PRESCRIPTION ONLY 29½ min., 16mm, snd., b&w, National Film Board of Canada

Film Digest:
Once upon a time survival depended on natural hardihood. Today chemotherapy, the chemical approach to disease and healing, has introduced synthetic healers to facilitate good health. In this film we discover how the pharmaceutical industry has produced a variety of drugs to help man in his fight against debilitating and fatal microbes. Constant research and the development of new compounds have prolonged life and helped to shorten the institutionalization of patients with mental disease.

The scientific method for discovery and research used in chemotherapy is described and illustrated. The final test for a new drug is whether it will be of use to human beings. After a drug is declared useful, the Food and Drug agency checks it for safety. This public institution licenses all new drugs. Their main concern is for safety, not effectiveness. All new drugs are considered dangerous until the Food and Drug Department stamps its approval for widespread consumption.

Chemotherapy has changed the whole complexion of the control of diseases. Tuberculosis is an example. By producing drugs which have proven effective it has reduced its early potential as a major killer. There are still unconquered diseases for chemotherapy to attack such as -- diseases of the arteries of the heart, the virus of the common cold, and cancer.

Research in chemotherapy is confident that cures for these unsolved mysteries will be found. Compounding drugs is a major industry in which enormous amounts of medicines are mass produced and prepackaged for distribution. The pharmaceutical industry is highly competitive. Drugs usually have a life span of five years because new and better synthetics are always being discovered. This is a costly kind of research involving large teams of scientists from many fields.

Preparation Suggested:
The teacher should help students reflect on the following premises before they commence this project. (1) What is their theory of progress? (2) Is their world of 2000 A.D. going to have made progress in the light of #1. (3) How will people live, what type of work will be valuable, what foods will they eat, how will people enjoy themselves, etc.?

Vocabulary:
pharmaceutical
dossier
compendium
accrued
ensue
adhered
chemotherapy
synthesized
toxicity
tranquillizers

Program No. 11
Process Series No. 11
Master Teacher - Bella Kranz

Concepts Emphasized and Strategies Demonstrated:

I try to encourage the students to evaluate why it is they trust certain agencies in our society. I am concerned with how they think through this problem that has developed in our society. The issue is particularly highlighted by the expansion and growth of our population and the expansion and growth of the processes of production. Because of these two factors human beings have gotten to put their faith in the experts, especially when it comes to their health and aspects of their well-being.

I invite the students to infer this by showing them film clips from the film on pharmaceutical research and by using analogies to the Post Office, the Food and Drug Administration and the Federal Communications Commission. Then I suggest the paradox: when must you be cautious about placing trust in agencies, experts, a potential "Big Brother"? I am interested in alerting the students to an important strategy for thinking through a problem; that is, to look for paradoxes in seemingly harmless concepts or rules.

I suggest that they build a profile of conformity by keeping in mind when it's necessary to obey the rules set down by others for our own well-being and when we have to be aware of an encroachment upon our individualism. Building such a profile is like building a profile of a molecule in chemotherapy. The steps suggested are those recognized as the ones used in the scientific method as illustrated in the film, "On Prescription Only."

As I viewed the automation of the drug industry, it occurred to me that individualism was being encroached upon by still another process, a mechanization whereby intellectual talents useful today would soon become obsolete. The obsolescence of human talent is compared to the obsolescence of some drugs over a five year period. I suggest to the students that here is another analogy from the film that ought to get our attention. The pharmacist, mixing the compounds, has practically become obsolete due to automation as has the fine cabinet maker or carpenter. The student learns to infer this from the structuring of my question. The students consider what obsolescence means to them in terms of their education today and in the future. I assign them the task for constructing the hypothetical world of the year 2000.

Program No. 11
Inservice Series No. 11
Master Teacher - Bella Kranz

## Interpretation and Discussion of Strategies

I demonstrate how dealing with a theme is preferable to making a curriculum choice that concentrates on isolated data. This time I illustrate how I started with a simple inference, trust, and slowly, through divergent and evaluative questioning, expand the concept of trust to a tri-level meaning. I show that trust in the expertise of people or institutions is sometimes wise and desirable, but that sometimes the converse attitude may also be wise and desirable.

I suggest that if the theme unfolds gradually, whereby the student has had opportunities to make inferences and discoveries, it becomes meaningful and relevant to the learner. By the time I present the problem; how much conformity is appropriate and how much is a danger to individualism, the student had many occasions to think about this theme. By introducing the theme on three levels, each time emphasizing a different cognitive strategy, the student begins to see that it is his individualism that may be endangered now or in the future. If you can help the student internalize cognitive problems he becomes more involved in a solution to the problem.

Jean Piaget and Jerome Bruner have more to say about the internalization of knowledge and how the learner becomes involved. Two works I suggest for study are: Piaget -- "The Child's Conception of the World," and Bruner -- "Toward a Theory of Instruction." More on structuring for unusual responses may be learned from Hilda Taba's: "Learning by Discovery: Psychological and Educational Rationale" and Teaching Gifted Students, A book Of Readings ed. by James J. Gallagher.

I give some illustrations on how to structure and frame cognitive memory questions, convergent thinking questions, divergent thinking questions and evaluative type questions.

# EXAMPLES OF
# WAYS TO PRESENT PROBLEMS TO
# TAP DIFFERENT INTELLECTUAL OPERATIONS FOR PRODUCTIVE THINKING

Prepared by Bella Kranz

| Intellectual Operations | Arithmetic | Social Studies | Others |
|---|---|---|---|
| Cognitive Memory | 1. 6 + 3<br>2. The properties of addition. | 1. Who shot Lincoln?<br>2. When was Napolean defeated by the English?<br>3. When did Huck decide not to turn in Jim? | 1. How many products are produced by China for export?<br>2. What are the major industries in Minnesota? |
| Convergent Thinking | 1. If I have $4.00 and someone gave me $2 more what amount would I have?<br>2. If I have a set of 3 points, how many line segments can I draw? | 1. What would you think would be the logical reaction of the North to the assassination of Lincoln?<br>2. In what way was Napoleon's tragedy like Hitler's? | 1. What caused Huck to change his mind about Jim?<br>2. The price of land at Detroit Lakes has steadily increased. What factors have contributed to the increase? |
| Divergent Thinking | 1. How many different ways can you get 4?<br>2. Looking at a number line how many ways can you add, subtract, multiply, or divide? | 1. If Columbus had landed in Boston, New York, or Maryland, what might the history of that region be like?<br>2. If you overheard a conversation on the steps of the Parthenon, 2500 B.C., what would it be about? | 1. If you had to tell time without the use of a watch how many different ways could you do so?<br>2. What would happen if Fargo-Moorhead were suddenly cut off from all transportation or communication? |
| Evaluative Thinking | 1. What is the most appropriate way to solve 36 X 48? | 1. Were the Indians of the southwest better off after the missionaries of Spain came into their lives? Why? Why not? | 1. Would a woman of Helen Keller's talents develop without the help of someone like Anne Sullivan? Why? Why not? |

Premise: The style of the problem or question determines the resultant thinking process. . . . i.e. convergent or divergent thinking

Program No. 12
Content Series 12
Master Teacher - Earl Anthony

Thematic Subtopic:
In Search Of Adequate Education For Competing In A Complex Technical Society

Film:
URBAN SPRAWL 15 min., 16mm, snd., color, The International Film Bureau Inc.

Film Digest:

The purposes of this film are: (1) to increase the understanding of the professional city employee's work in helping citizens and their elected representatives solve complex local problems and (2) to encourage people to prepare for local public careers. Following a criticism and resulting newspaper headlines of a proposed municipal budget in a city that grew from a "crossroads town with a crossroads government," a reporter is directed to get the "other side of the story" of the city government from city personnel. Interviews with directors of finance and planning, the city manager, plus checks into various departments reveal that citizens of growing cities demand more than minimal government services. The film emphasizes that a "crossroads government" cannot cope with the magnitude of problems and needs of public services found in the rapidly changing urban living of today.

Film Concepts:

This film is designed to stimulate student interest in the challenges in one of the most important phases of our governmental process, local government administration. It introduces students to the backgrounds, motivations and goals of the people engaged in carrying out the activities of local government. The basic concepts of the film are:

1. Identifying the increasing number and growing complexity of the problems faced by local municipal governments.
2. The necessity for professionally trained and skilled personnel within local government to meet these problems.
3. The need for teamwork among the departments of local government to successfully solve these problems.
4. The need to search and identify truisms in governemnt today.
5. To understand primary traditions (heritages) in the American "way of life" for the purpose of planning an effective government for tomorrow.

Vocabulary:
elected representative of local government
administrative organization within the government

Provocative Questions:
1. What does local government mean to you?
2. What are the important truisms in government we live by?
3. How can tomorrow's government be different from today's without changing its primary purposes and its resultant "way of life" for its people?

Program No. 12
Process Series No. 12
Master Teacher - Earl Anthony

Concepts Emphasized:

This lesson is designed to stimulate interest in local government. This interest should give rise to questions. The questions will be analyzed for truisms in local government for building an attitude about what type of citizen should an individual be to serve the purpose of improving government.

Strategies Demonstrated:

The process taught in this lesson is the inquiry approach to the understanding of city-manager type of local government. Through this process a person is able to "build theories, test them, incorporate them, use them in finding greater meaning and unity in experience." The inquiry process is accomplished in this lesson by applying the following technique: from the known facts about local government based upon the events, models, vocabulary, and examples presented in the film and by the television teacher, the student will take in and incorporate what he perceived in terms of what he knows and understands about city-manager type of local government. All of his collected data is processed in terms of his conceptual systems. As the learner progresses through the lesson, the process goes on continuously as he encounters familiar events and situations so he can assimilate without conflict. After the student develops this confidence for assimilation he is suddenly confronted by events which he cannot predict and is unable to explain within the framework of his existing knowledge and background.

> Example: Is an example of a truth characterized by a nonchanging government? What is meant by a truth? How can tomorrow's government be different from today's without changing its primary purposes?

To accomplish this the student is involved in a process of reshaping and reorganizing his conceptual structures until they fit and account for perceived events. This is where the lesson invites the learner to make comparison between government and business. Through inquiry the student experiences a need for new facts, and to learn more about the circumstances effecting these new facts.

Program No. 12
Inservice Series No. 12
Master Teacher - Earl Anthony

## Interpretation and Discussion of Strategies

The purpose of this lesson is to bring to the classroom teacher's attention a process of learning called inquiry that assimilates and accommodates facts within the learner so the student can build theories, test them, incorporate them within a broader conceptual system and use them in finding greater meaning and unity in experience. To accomplish this, Bloom's seven "Taxonomy of Educational Objectives" will be the "learning vehicle" used to develop creative and cognitive abilities in the student. The film material is to serve the purpose of preparing the learner in search of adequate education while competing in a complex world.

Bloom: "Taxonomy of Educational Objectives"
The seven educational objectives used in the process lesson are:

1. Translation - the ability to put a communication into another language. To state a problem or clarify a principle by giving an illustration.
2. Interpretation - a reordering of ideas into a new configuaration in the mind of the individual. It goes beyond translation to comprehend the relationships between its parts. To reorder or rearrange and relate to one's own fund of experience and ideas. Suggested activities of this objective could be drawing inferences concerning statements and making generalizations concerning experiences.
3. Extrapolation - goes beyond translation and interpretation to trends or tendencies beyond the data. It suggests if "this" is true, what will happen now? Suggested activity would be drawing conclusions from data.
4. Application - uses old principles to solve new problems. It is the ability to generalize or state principles. Suggested activities for application could be finding a solution to a problem with reason for selection. Proper attitude toward learning, self-confidence, or self-control are additional activities.
5. Analysis - the ability to emphasize the breakdown of material into parts. Adds to fuller comprehensions and is a prelude to evaluation. Suggested activities could be listing elements of composition or listing unstated assumptions which seem to be involved.
6. Synthesis - is the ability to put together; rearranging; the production of a new communication which will develop a new whole. Suggested activities is making a collage or planning a set of operations.
7. Evaluation - the learner gives judgement concerning ideas producing events. Suggested activities could be to recognize needed changes through adequate testing of procedures.

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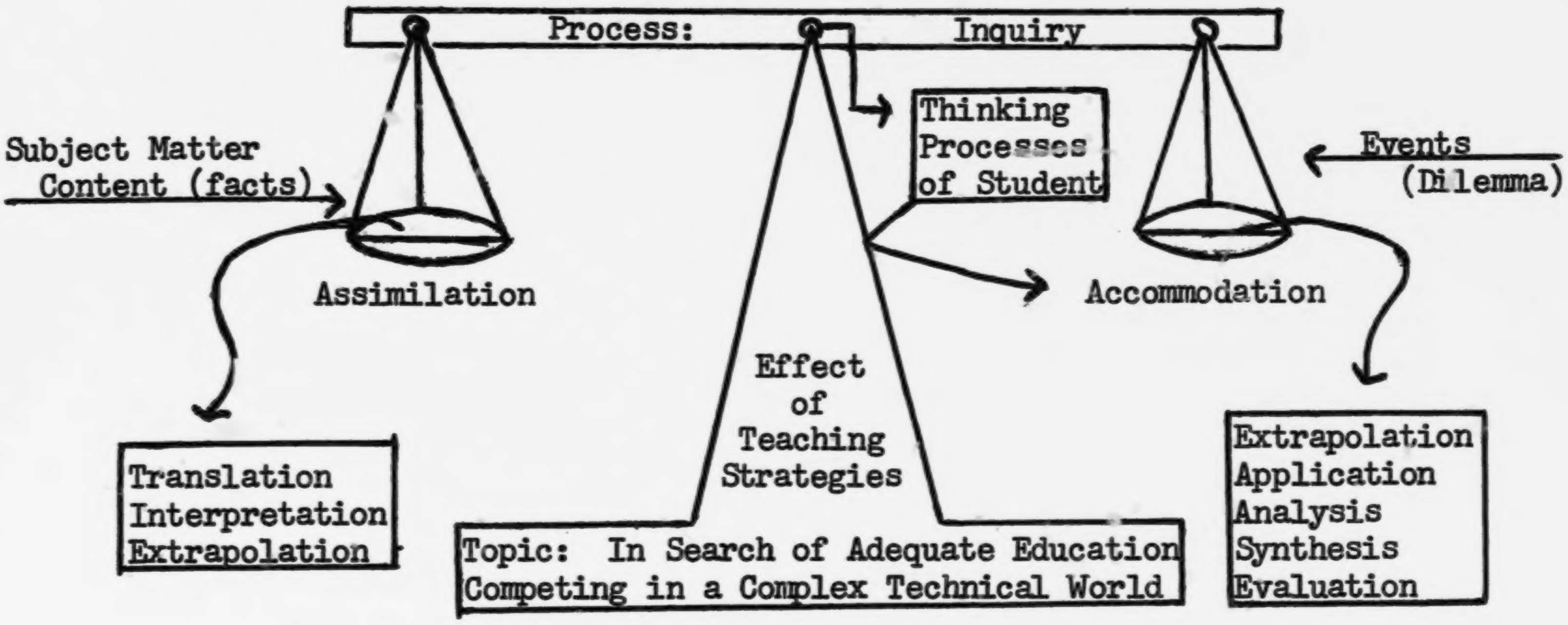
Program No. 12
Inservice Series No. 12
Master Teacher - Earl Anthony

**Diagram:** Diagram Used in Teaching The lesson In Process Series No. 12 Balanced learning experiences - Centered.
**Model:** (3 dimentional)
**Purpose:** Teach The Inquiry Method.


Process: Inquiry
Subject Matter Content (facts)
Assimilation
Thinking Processes of Student
Events (Dilemma)
Accommodation
Effect of Teaching Strategies
Translation
Interpretation
Extrapolation
Topic: In Search of Adequate Education Competing in a Complex Technical World
Extrapolation
Application
Analysis
Synthesis
Evaluation

## Interpretation and Discussion of Strategies

Added to pans to produce learning by inquiry are Bloom's Objectives. To the "pan" labeled assimilation: Translation, Interpretation, and Extrapolation are used to accomplish assimilation. To counterbalance assimilation of facts-Extrapolation - (used for unity of learning) - added to Application, Analysis, Synthesis, and Evaluation.

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Program No. 13
Content Series No. 13
Part I
Master Teacher - Earl Anthony

Thematic Subtopic:
In Search Of Adequate Education For Competing In A Complex Technical Society

Film:
AUTOMATION: WHAT IT IS AND WHAT IT DOES 13½ min., 16mm, snd., b&w, Coronet Instructional Films

Film Digest:

The uses of automation are constantly increasing. Many businesses use computers for inventory and bookkeeping. Your school may use an automated process to plan students' schedules and to issue grades. The film shows a steel mill where the quality of the steel is automatically maintained, and a petroleum refinery where a computer manipulates the entire industrial process. We also see how the paper work in a bank is done by electronic computers, and how computers are used to test possible rocket designs.

Since automation brings changes every day, it is important to understand exactly what it is and to be aware of its applications, its benefits and the problems which it creates. The film presents these matters clearly and simply, giving the students insights into the far-reaching effects of automation, and its implications for their own lives.

Film Concepts:
1. Identifying the levels of automation.
2. To understand the element of feedback in a fully automated system.
3. High levels of automation and the uses of the electronic computer.
4. How automation affects man.

Vocabulary:

feedback
electronic computer
digital computer
analogue computer

Provocative Questions:
1. What are some limitations of automation?
2. What does automation offer man in the future?
3. What are employers and labor unions doing for workers whose jobs have been taken over by automation?
4. How are governmental and educational institutions helping students prepare for increased automation?

Program No. 13
Content Series No. 13
Part II
Master Teacher - Earl Anthony

Thematic Subtopic:
In Search Of Adequate Education For Competing In A Complex Technical Society

Film:
WHAT IS AUTOMATION? 14 min., 16mm, snd., b&w, Film Associates of California

Film Digest:

Today we have automatic machines that work in sequence - one taking over where the other leaves off. This is automation. Automation has tremendously increased both our ability to produce and our leisure time. This film takes us into an automated factory where we see automation in action. A few skilled workers supervise the machines and check the quality of the product. In the future, as more and more production becomes automated, man will have more leisure time. But the demand for workers with the skills needed to supervise automated factories will greatly increase.

Film Concepts:
1. Machines save man time and effort.
2. Automatic machines do their jobs without operators.
3. Automatic machines can do man kinds of work: heavy work, precise work, and mental work.
4. Automatic machines can be designed to work together. This is called automation.

Vocabulary:
mechanization automation elements in an automated system

Provocative Questions:
1. How do machines increase our spare time?
2. In what ways can man give instruction to machines?
3. Name an automatic machine in your home (automatic washer, pop-up toaster). Why is it automatic?
4. What is an automated factory?
5. Why are fewer workers necessary in an automated factory? What kind of work do these workers do? Do you think they need training?

Materials:
Materials needed by students while viewing the process discussion: pencil and paper. Research materials on the topic should be available following the viewing of the films.

Program No. 13
Process Series No. 13
Parts I and II
Master Teacher - Earl Anthony

Concepts Emphasized:

1. Machines save man time and effort.
2. Automatic machines do their jobs without operators.
3. Automatic machines can do many kinds of work: heavy work, precise work, and mental work.
4. Automatic machines can be designed to work together. This is called automation.
5. Automation has different levels.
6. Two elements of high level automation are feedback and computer control.
7. How automation affects man.
8. In search of adequate education by student through experiencing the creativity process.

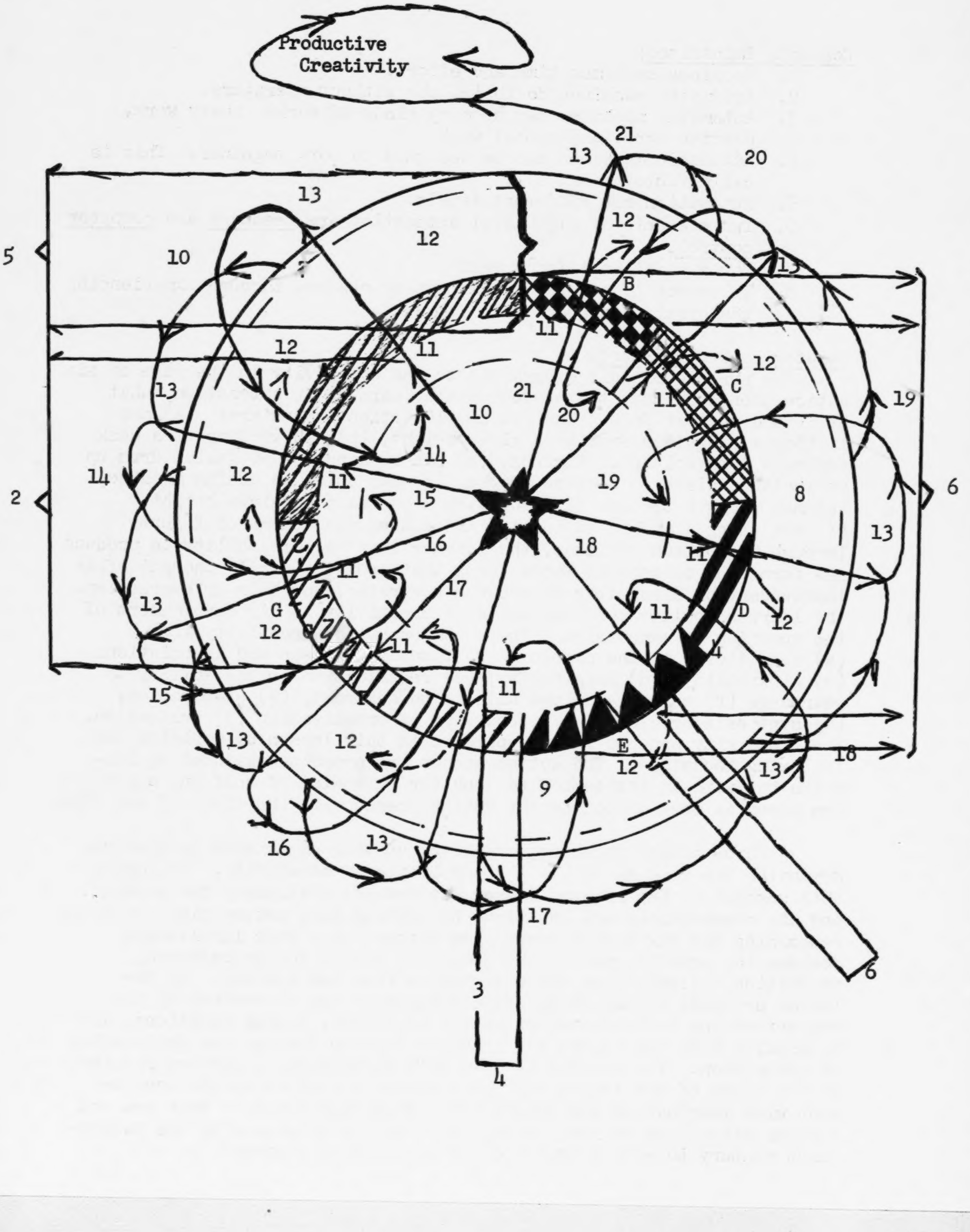
Strategies Demonstrated:

The purpose of this program is to use creativity in the form of six action scenes so that the student could learn about automation, what it is and what it does. The six simple action scenes are: (a) man lifting a 50 gallon drum to a given height, (b) man working at a desk adding a long column of figures, (c) man rolling the 50 gallon drum up an inclined plane to a given height, (d) man using an adding machine, (e) man using a tractor lift to raise a barrel to a given height, (f) man using a modern calculator and adding the column of figures. Through incubation of ideas, the learner involves his ability to produce new forms and to conjoin these forms that are customarily thought of as independent or dissimilar to produce a strategic problem or expression. The learner applies the components of creativity in his development of the question or expression. These components of creativity are: (a) sensitivity to the problem, (b) fluency of ideas and associations (c) flexibility, (d) originality, (e) redefinition or the ability to rearrange (f) analysis or the ability to abstract, (g) elaboration, (h) synthesis or closure (i) coherence of organization (j) evaluation. The creativity process is accomplished in this lesson by applying the following technique: The action scenes are presented without explanation but with an invitation to look for extension of self and questions are posed as they associate the action scenes with the title of the film.

A three minute thinking, creating, writing experience is involved demanding the student to use the components of creativity. Following this segment of the process lesson the teacher challenges the student and his observations and questions by listing nine provocative questions concerning the six action scenes and automation. This involvement deepens the creative process by demanding a need for preparation, incubation, illumination and elaboration from the learner. As the lesson proceeds needed facts about automation are discovered by the student making facts necessary to ask questions, answer questions, and to predict what the future has in store for man through the application of automation. The student is left with an unsolved suggested problem at the close of the lesson for the purpose of continuing his involvement with imagination and creativity. That question is: What new and further extensions of man's abilities could be developed by the twenty-first century to move a drum and add a column of figures?

57 **Teaching Model**: **Used in teaching the lesson - Automation: What It Is and What It Does**

A. **Sketch of Model**: Showing productive creativity: how it starts, how it develops or fails in the lesson.


Productive Creativity
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## B. INDEX OF TEACHING MODEL FOR PROCESS SERIES NO. 13

1. Topic "E": In Search of Adequate Education - Competing in a Complex Technical World

2. Activity Centered: Six action scenes observed by student (Teaching strategies applied by teacher)

3. Title of Study: Automation: What It Is and What It Does

4. Environment: Learner is in interaction with environment which contains the stimuli for learning.

5. Student: (If student is gifted - he is all encompassing)

6. Thinking processes of student (seven)
   A. Fluency
   B. Flexibility
   C. Originality
   D. Elaborate
   E. Willingness to risk
   F. Preference for Complexity
   G. Curiosity

⑦. Need for subject matter content for creative learning

⑧. Need release from: strong feeling of insecurity; feelings of inadequacies; emotional disturbances

⑨. Individualized freedoms in learning and experience

### Components of Creativity

10. Sensitivity to Problem

11. No reaction with learner (stimulus doesn't react with learner)

12. Reacted - but lost the effect of the stimulus

13. Complete reaction to stimulus

14. Flexibility

15. Synthesis

16. Fluency of ideas and associations

17. Analysis

18. Elaboration

19. Redefinition or the ability to rearrange

20. Originality

21. Evaluation and Coherence of organization

Program No. 13
Inservice Series No. 13
Parts I and II
Master Teacher - Earl Anthony

## Interpretation and Discussion of Strategies

The purpose of this discussion is to bring to the attention of the classroom teachers a suggested procedure of learning called productive thinking. Productive thinking is that kind of attack on a problem which results in something that proves helpful in solving it or that proves to be a direct, significant step toward ultimate solution. It is a "wrestling" with a problem that results in the development of alternatives which in time proves to be a contribution in direct line toward the solution of the problem. Creativity is essential for productive thinking and is the process stressed.

Definitions of creative ability by Guilford and Torrance were emphasized in the teaching of the lesson on automation. Their definitions stress the components of creativity: (1) sensitivity to problems, (2) fluency and flexibility in thinking as indicated by a capacity to formulate divergent alternatives as contrasted with engaging in conformity patterns of thinking and (3) the ability to redefine situations and make mental examinations of results. One necessary factor to developing creative ability is a background of knowledge that enables the individual to formulate many ideas, to make new combinations of these ideas and to make mental tests of them. A second factor necessary is to have access to materials from a wide variety of fields.

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Program No. 14
Content Series No. 14
Master Teacher - Earl Anthony

## Thematic Subtopic:

In Search Of Adequate Education For Competing In A Complex Technical Society

## Film:

THE COMPUTER AND THE MIND OF MAN 30 min., 16mm, snd., color, National Educational Television

## Film Digest:

"The Computer and the Mind of Man" is a provocative series of films on the electronic computer. The 30 minute film viewed for this discussion is the segment titled: The Control Revolution. Through animation, the film pictures the basic elements in a modern, continuous, self-adjusting control system. "Feedback" is shown to be essential; a thermostat is used as a simple example, then, control systems built around a computer are discussed. For illustration, John McCarthy of the Wyman Gordon Company, a medium-sized industrial plant, shows computer installation at the plant and how his firm uses the computer to keep track of and integrate information on everything from inventory to payroll. A Computer is shown controlling and operating the tooling of delicate machine parts at the numerical machining corporation in Cleveland. Continuous and automatic process control by computer is shown at the Standard Oil refinery in El Segundo, California. The computer is also shown at work recording, storing, and processing the vast data handled by the Social Security Administration in its Washington, D. C., headquarters. Each of the guests; Dr. Forrester, Dr. Hamming, and Professor Dantzig, adds his won comments about the ways in which computers release corporate management from routine decision-making so that increased attention can be given to more difficult problems.

## Film Concepts:

1. The computer used by man is his release from slavery to a dull, repetive routine.
2. The computer with its new questions potential will enable man to get new answers to future problems.
3. The control revolution is composed of basic elements in a modern, continuous self-adjusting control system.
4. The computer releases management from routine decision-making so that increased attention can be given to more difficult problems.
5. The concept of who is in control of the control routine is posed.
6. Problem-solving learning is man's way of using his mind to solve new problems.

## Vocabulary:

digital computer
analogue computer
programming
Cathode ray tubes
input
output
memories

## Provocative Questions:

1. Will machines ever run man?
2. How does the mind of man solve problems?
3. Who is in control of the control routine?
4. What does the electronic computer mean to mankind, now and in the future?

Program No. 14
Process Series No. 14
Master Teacher - Earl Anthony

Concepts Emphasized:

Through the process of developing a problem-solving learning diagram to be used by the student as well as the classroom teacher, the following concepts are taught in this discussion.

1. The computer used by man is his release from slavery to a dull, repetitive routine.
2. The computer with its new questions potential will enable man to get new answers to future problems.
3. The control revolution is composed of basic elements in a modern, continuous self-adjusting control system.
4. The computer releases management from routine decision-making so that increased attention can be given to more difficult problems.
5. The concept of who is in control of the control routine is posed.
6. Problem-solving learning is man's way of using his mind to solve problems.

Strategies Demonstrated:

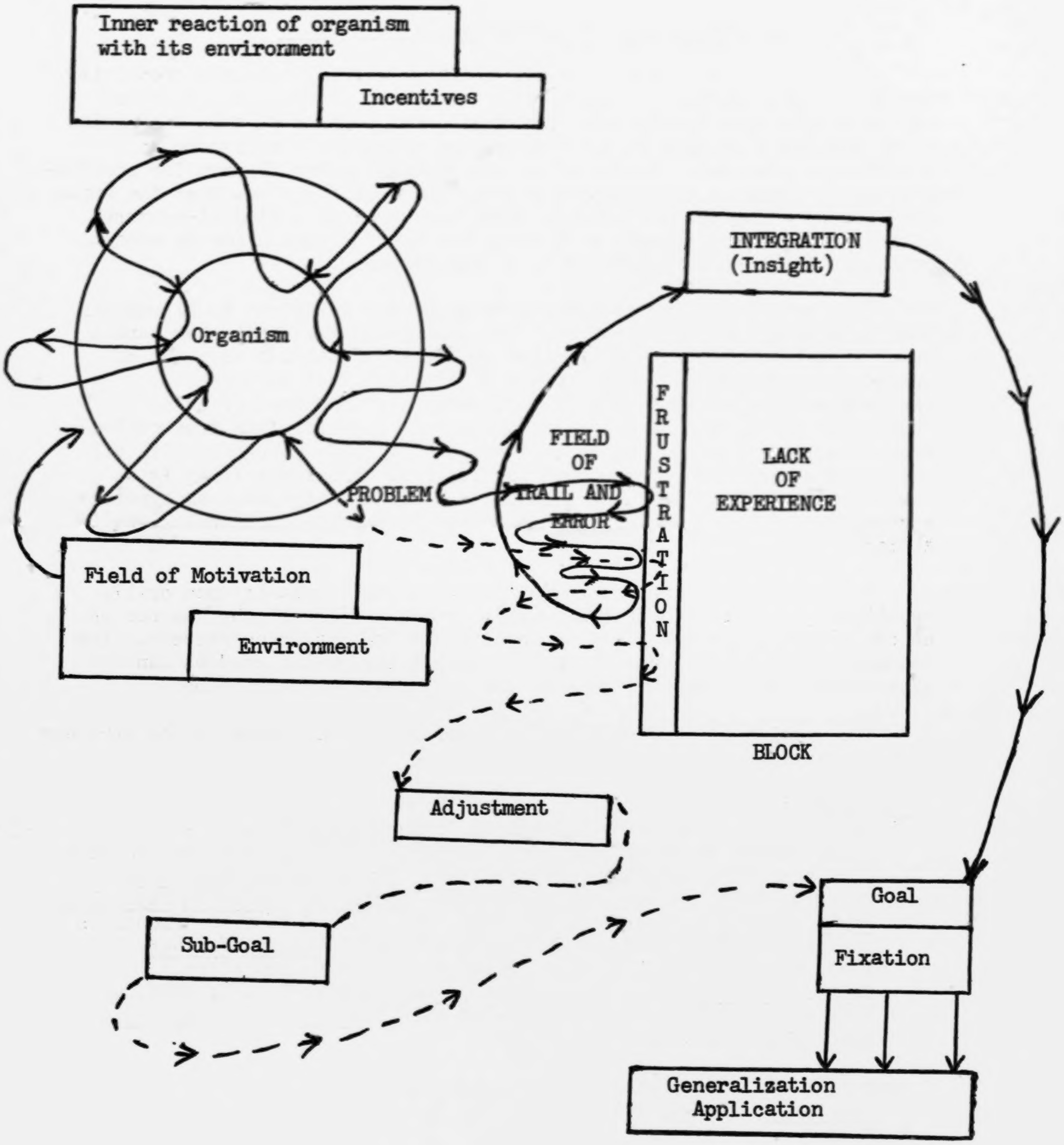
The purposes of this discussion is to acquaint the student and teacher with the computer and how it functions, and showing man's new way of solving his problem. A diagram for problem solving learning was constructed and explained during the first segment of the discussion. The diagram answers the question: How does the mind of man solve problems? The diagram is reviewed. It is followed by the the question: Will machines ever run man? Through research about electronic computers, the discussion presents information about the computer control system and places man in the final position as the one who determines what is to be done.

Supplies:

1. Research materials on electronic computers.
2. Diagram for problem-solving learning.

## DIAGRAM FOR PROBLEM-SOLVING LEARNING
Prepared by Earl Anthony

### Structure Model


Inner reaction of organism with its environment
Incentives
Organism
PROBLEM
Field of Motivation
Environment
INTEGRATION (Insight)
FIELD OF TRAIL AND ERROR
FRUSTRATION
LACK OF EXPERIENCE
BLOCK
Adjustment
Sub-Goal
Goal
Fixation
Generalization Application

Program No. 14
Inservice Series No. 14
Master Teacher - Earl Anthony

## Interpretation and Discussion of Strategies

Studies relate that all problem-solving learning involves creativity. Creativity and problem-solving activities can be conveniently embraced in the single term "productive thinking." One purpose of this discussion is to present a diagram of activities that a learner experiences in solving his problems. In the inservice discussion the diagram for problem-solving learning is presented to answer the question: "How does the human mind learn?" The problem-solving technique involves a student-centered activity to aid the student to further his need to search for an adequate education while he is competing in a complex world.

Problem-solving is basically a "search" for solutions to situations that have novel elements in them. The problems-oriented teacher cannot teach inventiveness, openness or the exploratory attitude as a set of procedures. The teacher must create a "climate" that fosters the emergence of these qualities. "Climate" is a product of being frustrated or blocked in one's advance toward a goal. This frustration evokes feelings-anger, wonder, excitement, enthusiasm, urgency-with all the accompanying behaviors within the learner. Problem-solving is a challenge demanding "if-then" thinking. This activity involves hypothesizing, experimenting, evaluating and finally testing the conclusions in action.

The problem-solving procedure is contrary to emphasis upon drill, repetition, and "right answers." This procedure "frees" the learner so he can afford to be wrong and be involved in the searching process. The teacher's behavior is crucial in problem-solving so the student can experience a wide range of exploration and creative questioning.

The problem-solving diagram for learning included here is the strategy used in this discussion.

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Program No. 15
Content Series No. 15
Master Teacher - Glenda C. Peterson

Thematic Subtopic:
In Search Of Beauty For Inspiring Man's Joy In Living

Film:
BRAZILIA 15 min., 16mm, snd., color, International Film Bureau

Introduction:
An introduction to the film will include the presentation of the importance of man's ideas, dreams, hopes and desires for the future. It will lead to the importance of imagination and the idea that our civilization is the product of creative thinking. The location of Brasilia will be noted and questions will purposefully be directed to the students to keep in mind while viewing the film.

1. Why was the building of Brasilia described as the most daring project in this century?
2. What problems had to be faced with materials for construction?
3. Why was the new capital built in the wilderness?

Film Digest:
Brasilia, the new capital of Brazil, carved out of the jungle, is an architect's dream. A man-made miracle of the 20th century, this architectural and city-planning wonder stands on a high plateau about 600 miles northwest of Rio de Janeiro.

The documentary film traces the beginnings of the new capital from the first clearing of forest land in March, 1957 to its inauguration on April 21, 1960. The daring project was planned as a whole unit. It took three years to build, an unusual achievement in the history of architecture.

The film records the steps in the city's development from Lucio Costo's pilot plan and Oscar Niemeyer's bold architectural ideas to its population growth and use as the new capital. We see from several views the Plaza of the Three Powers; the two Chambers of the Brazilian Congress; Niemeyer's concrete-ribbed and glass cathedral; administrative and residential blocks; the President's Palace; and modern sculpture which enhances the architectural designs for the buildings.

The building of new roads and an airport connecting the new capital with the major coastal cities is shown. Brasilia, a miracle city and dream that came true, is not the final aim or objective. It is a symbol of the future and an initial step toward the development of vast, rich central Brazil.

Preparation Suggested:
Teachers should please see that each student is supplied with pencil and paper as there will be interaction between the TV teacher and student. It is recommended that a wall map of South America and a globe should be furnished and opportunity given to become familiar with the location of Brazil.

Program No. 15
Process Series No. 15
Master Teacher - Glenda C. Peterson

Concepts Emphasized:

The lesson will be initiated by a quick resume of the content of the film "Brasilia." This will be followed by a review of the possible answers to the questions which were introduced by the teacher after the viewing of the film. We will then focus our attention on the development of thinking strategies aimed at encouraging willingness to take risks, flexibility, creativity and open-endedness. These will be used in order to provoke thinking about city-planning and living in the 21st century. Ideas developing about the advantages of creating a new city over living in an already established heavily populated city will be emphasized. We will plant the seed for seeing the need of creating ideal cities where tomorrow's problems can be met. We will point out the human touch to the development of a paragon city.

Strategies Demonstrated*

| Strategy | Definition | Application |
|---|---|---|
| 1. Examples of deficiencies | Thinking about what man does not know; things wrong with something. | List all the things you can think of that cannot be planned for in a city. |
| 2. Thinking of possibles | Guessing or hypothesizing; thinking of probabilities; constructing alternatives | How would you develop a highway system to avoid traffic problems |
| 3. Provocative questions | Inquiry to bring forth meaning; incite knowledge exploration | How would you set up a financial plan to support and build an ideal city? |
| 4. Examples of change | Provide opportunities for making changes, or substitutions | How would you solve the major problem of preventing air polluti in a future city? |
| 5. Adjustment to development | Learn how to learn from mistakes or failures; examples of development rather than adjustment to something already developed. | What are the advantage in building a new city instead of redevelopin an old city? |
| 6. Reinforcing originality | Allowing opportunities to think of something no one else has though of | Where in the world would you build a new city? How would you justify the location you chose? What major problems will you face during construction? |

*Strategies derived from Frank E. Williams' design for productive thinking.

Program No. 15
Inservice Series No. 15
Master Teacher - Glenda C. Peterson

## Interpretation and Discussion of Strategies

This program will demonstrate classroom strategies for stimulating original thinking and encouraging unusual responses. A case study of Brasilia, a "new" capital city, was shown as an example of man's efforts to introduce new and different approaches to solve the common problems of big city living. Attention will be focused on the production of original ideas and possible solutions for solving problems of living in a modern big city. Emphasis will be placed on illustrating how the teacher can divert thinking and discussion from the obvious.

Such techniques as finding answers that reflect possible solutions to questions as why? why not? what if? are all solid foundations for stimulating this kind of creative thinking. These are demonstrated in the process film.

In general we will try to conceptualize in the broad sense of why we should be particularly interested in Brasilia. Why would people want or not want to move into a dream city? What if we were in a position to promote and encourage people to move to an "ideal city"? What could we offer as incentives for the move?

Guilford and Torrance define creative ability and emphasize necessary criteria for its development. Sensitivity to problems, fluency and flexibility in thinking and the ability to redefine situations and make mental examination of results will encourage and stimulate the development of creative ability. It is necessary to have a background of knowledge to enable the student to produce ideas, to make new combinations of the ideas and to make mental tests of them. We must also encourage the students to make use of their research abilities so as to have access to a wide variety of materials. We need to enrich their concept of accuracy by learning to represent facts in probability form. We should try to cultivate the active and rich imagination of our future citizens of tomorrow.

To expand your understandings of what will be in the process program and to get further clarification on the development of such processes, it is recommended that you refer to the following references:

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Aschner, Mary Jane and Bish, C. E. (eds.), Productive Thinking in Education (Washington, D. C.: National Education Association, 1965).

Myers, R. E. and Torrance, E. P., Invitation to Thinking and Doing (Minneapolis, Minnesota: Perceptive Publishing Company, 1961).

Torrance, E. P., Guiding Creative Talent (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962).

Wilson, R. C., "Developing Creativity in Children," Education, Vol. 81, 1960, pp. 19-23.

Program No. 16
Content Series No. 16
Master Teacher - Glenda C. Peterson

Thematic Subtopic:
In Search Of Beauty For Inspiring Man's Joy In Living

Film:
ENDURING WILDERNESS 28 min., 16mm, snd., color, National Film Board of Canada

Introduction:

The film is introduced by a presentation of the importance of the wilderness. We ask the students to think of its values. Does the wilderness satisfy any of man's needs other than the obvious ones? What must be done now to assure a green legacy for tomorrow? We present the fact that the film sounds a challenge to all of us. While viewing the film the student should look for that challenge.

Film Digest:

Scenes of wilderness splendor filmed in Canada by superb nature photographer, Christopher Chapman, make an eloquent plea, with a minimum of narration for preserving the natural beauty of remaining wild areas by creating more reserves and sanctuaries. Visual emphasis is given to man's need for "the tonic of wildness" considered vital by Henry David Thoreau. It shows the value of wilderness as a healthy retreat from the stress and strain of everyday urban life.

The film illustrates the beauty of the land before the white man arrived, when the vast wilderness of North America was ruled by the laws of nature. Not even the Indian tribes disturbed the natural interdependence of plants and animals. Four hundred years ago the settlers began a long fight to tame this wilderness. The pattern of nature gave way to the pattern of man. Today the land is dominated not by wilderness, but by man.

Far-sighted men of the last century set aside pieces of land in their original state. These National Parks provide an opportunity to go back to the earlier pattern of the wilderness. The parks require expert planning and management to remain unchanged. Public understanding and appreciation are essential, too.

As population and urbanization increase, the need is urgent to create new reserves and sanctuaries in regions which are just now beginning to feel the first pressures of civilization. New parks are needed where future generations can enjoy the ageless splendor of the enduring wilderness.

Program No. 16
Process Series No. 16
Master Teacher - Glenda C. Peterson

Concepts Emphasized:

We begin our lesson by repeating the challenge of the film, The Enduring Wilderness. Throughout this program, we focus our attention on developing the creative and cognitive abilities of the students through the subject of conservation for the future. We look at the value of the wilderness and establish why we should be concerned about preserving it now. We search for ways to link the existence of wilderness areas to things that are positive goals to Americans. We look at the problem of creating new reserves and sanctuaries in the future, compare the growth of population and the areas that are available, and look for possible solutions to solve the problem.

Strategies Demonstrated:

Based upon Bloom's "Taxonomy of Educational Objectives" the following creative and cognitive abilities to be developed are listed below:

| Objectives | Definition | Application |
|---|---|---|
| Translation | The ability to put communication into another language, another form of communication. | Thoreau said that there was a man's need for the "tonic of wildness." What does this mean? |
| Interpretation | A reordering of ideas into a new configuration in the mind of the individual. To reorder or rearrange and relate to one's own fund of experiences and ideas. | Recreational uses and wood production on forest lands are compatible. Draw inferences concerning that statement. |
| Extrapolation | To translate, interpret, and go beyond to trends or tendencies beyond the given data: if this is true, what will happen now? | If you were a Congressman, vote for or against extending park area. Why? |
| Application | Use old principles to solve new problems. To restructure and classify a situation so that the correct abstraction applies. To generalize or state principles. | Select one solution to the problem of conservation of resources to all people, now and in the future, and give reasons for the solution. |
| Analysis | Emphasizes the break down of material into constituent parts and detection of the parts and the way they are organized. Aids in fuller comprehension and is a prelude to evaluation. | List as many examples as possible to support the statement that forests are our greatest resources. |
| Synthesis | The ability to put together; rearranging; production of a new communication; arranging and combining pieces, parts, elements, etc., into a new whole. | Plan a conservation program for television that will prove the point that you would like to make people more aware of conservation for the future. |
| Evaluation | Give judgements concerning ideas, products, events. | Recognize changes that will be needed in conservation in the future. |

Program No. 16
Inservice Series No. 16
Master Teacher - Glenda C. Peterson

## Interpretation and Discussion of Strategies

This program will present the techniques used for stimulating original thinking and encouraging unusual responses. The subject of conservation for the future is the content area upon which we base this lesson. We are emphasizing the preservation of the natural beauty of the remaining wild areas by creating more reserves and sanctuaries. Attention will be focused on the production of unique ideas and possible solutions for solving problems of conservation for the future.

We emphasize the fact that wilderness has values and satisfies man's needs. Everyone must do their part in planning the wilderness areas of tomorrow. Most importantly, it demands that we understand the world around us. We ask questions such as why? and what if? We have the students project themselves into the future. These are demonstrated in the process film.

The key to the future of the conservation program is to find arguments for and positive reasons why the wilderness areas are good for people. Having the children think of as many positive reasons as possible stretches their imaginations and provides opportunities for productive thinking. Have them look for ways to link the existence of wilderness areas to things that are positive goals to Americans.

Guilford says that since most of the creative thinking abilities are in the divergent thinking category, the teacher can seek opportunities to call for divergent thinking. It is possible to teach appreciation for those things from the past that are good as well as to encourage students to see how things might be done better. This is particularly true in the lesson of conservation where a group of foresighted men began our national parks. We can stimulate the students to be more sensitive to problems. Offer them possibilities to see that a problem may have more than one solution or several different interpretations and solutions. MacKinnon states that emphasis upon the transfer of training from one subject to another; the searching for common principles in terms of which facts from quite different domains of knowledge can be related; the stressing of analogies, similes and metaphors would strengthen the disposition to intuitive perception and intuitive thinking.

The following references are suggested for your convenience for further clarification into the areas of creative and productive thinking:

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Barron, F., "Creativity: What Research Says About It," NEA Journal, Vol. 50, March, 1961, pp. 17-19.

Guilford, J. P., "The Structure of Intellect," Psychological Bulletin, Vol. 53, July, 1956, pp. 267-293.

Hilgard, Ernest R., Theories of Learning, (New York: Appleton-Century Crofts, Inc., 1956).

Program No. 17
Content Series No. 17
Master Teacher - Glenda C. Peterson

Thematic Subtopic:
In Search Of Beauty For Inspiring Man's Joy In Living

Film:
DESIGN FOR LIVING 19 min., 16mm, snd., color, International Film Bureau

Introduction:

We begin by directing the attention of the children to a piece of modern furniture. We ask them what they think of first: its comfort? Its material? or shape? The film presents the principles of good design, especially design for the future. Suggested review of the following vocabulary will further prepare the students for the film:

aesthetic
contemporary
criterion
maintenance

Film Digest:

The film begins with a brief background of man's development of a design and the importance of the designer in today's economy. It continues with some illustrations of various aspects of design; honesty, simplicity, function, economy, elegance, and ease of maintenance. Old and new appliances are compared visually to point out developmental aspects of design.

The architect's contribution toward good design for living is explored in scenes from a well-designed contemporary home. Good flow and significant relationships between exterior and interior are portrayed. Examples of fine design related to dining are shown. The architect's provisions for relaxed outdoor living are also noted.

A second house is featured that is completely different from the first. The importance of good design in furniture is stressed. The film combines a tour through contemporary living areas with a visit to two homes. Principles of good design are stressed throughout the film.

After the film we will discuss the aspects of design in more detail and follow the development of design from primitive man. Our aim is to develop a more conscious awareness of design and how it affects our lives. We will look for advantages to innovations in making life easier for us now and in the future. What can be done in creating and designing a home environment which will foster good home and family relationships and make happier human beings?

Preparation Suggested:

It is suggested that each student have pencil and paper for use during the program.

Program No. 17
Process Series No. 17
Master Teacher - Glenda C. Peterson

## Concepts Emphasized and Strategies Demonstrated:

The introduction will emphasize the influence of design upon our lives. We review the progress of designing and look closely at a few examples of design that have not changed over many years because man's basic needs have not changed. We focus our attention on the development of thinking strategies aimed at flexibility, creativity and open-endedness. These will be used in order to encourage thinking about design for the future in the home environment. The advantages of creating furnishings and conveniences that satisfy man's needs and foster good family relationships are emphasized. It is important that we stress the fact that we are having the students design for personal use and enjoyment and to project themselves and their needs into the future.

Creativity is an important factor in the education of the gifted. Eight different abilities, at least, are involved in creative thinking.

| Ability | Definition |
|---|---|
| 1. Sensitivity to problems | - ability to see defects, needs, deficiencies; odd, or unusual, things that needs to be done |
| 2. Flexibility in handling data | - use of varied approaches, strategies, and kinds of solutions |
| 3. Fluency of ideas | - the ability to think of divergent ideas, new concepts, new combinations of data |
| 4. Originality of interpretation | - the ability to get away from the beaten track, break out of the mold, get away from the obvious |
| 5. Ability to redefine | - the ability to reconstruct a scientific phenomenon, theorem, story to uses and applications other than the intended ones |
| 6. Analysis | - the ability to examine things thoroughly so that they may be reconstructed in proper order and relationship |
| 7. Synthesis | - the ability to put things back together in wholes; creating the new |
| 8. The ability to organize | - to put things in order in the mind, to use facts and data toward the solution of the problem in context |

Program No. 17
Inservice Series No. 17
Master Teacher - Glenda C. Peterson

## Interpretation and Discussion of Strategies

The purpose of this program is to present classroom strategies and techniques used in the process film based upon Design for Living. The subject of design was adapted to suit our needs. We encourage the students to think about themselves and designs for their future needs. We ask them to look into the future and think about designing products that will fulfill them, making for a happier, satisfying life and creating an atmosphere which will foster good home and family relationships.

We will look at the process of creativity and creative thinking. In developing creative and cognitive abilities reference is made to Bloom's Taxonomy of Education Objectives. Emphasis is placed upon intuition and it's role in artistic expression and conditions for functioning of preconscious mental processes which produce creativity.

The process of creativity has been associated with problem-solving and the knowledge psychology has gathered about thought processes. Creative thinking is a special kind of problem-solving defined by characteristics of novelty, unconventionality, and persistence. An important characteristic of good problem-solving is flexibility. Flexibility takes into consideration all available approaches possible. A flexible problem-solver would come up with more novel and unconventional solutions. Problem-solving is a search, basically for solutions to situations that have novel elements in them. The problem-oriented teacher can create a climate that fosters the emergence of the qualities of inventiveness, openness or exploratory attitude.

Torrance states that emphasis needs to be placed upon respecting creative ways of learning; being a helpful guide; engendering genuine empathy rather that stimulating identification processes; providing a friendly environment; making a stand for mutual understanding; respecting the dignity and worth of the individual.

The following references will be of further help to you in the development of creative and productive thinking:

Bibliography:

Getzels, Jacob W. and P. W. Jackson., Creativity and Intelligence (New York: John Wiley and Sons, Incorporated, 1962).

Torrance, E. P., Guiding Creative Talent (Englewood Cliffs, New Jersey: Prentice Hall, Incorporated, 1962).

Program No. 18
Content Series No. 18
Master Teacher - Judith Tidemann

**Thematic Subtopic:**
In Search Of Beauty For Inspiring Man's Joy In Living

**Film: Part I**
DISCOVERING CREATIVE PATTERNS 17 min., 16mm, snd., color, Film Associates

**Film Digest:**
Pattern is a visual organization; it is a designed repetition of one or more motifs. Through rhythmic arrangement a pattern comes to enrich the surfaces around us by leading the eye from part to part.

Special stress is placed on the patterns around us in nature. Man learns about patterns from the beauty of nature thus he is able to create imaginative patterns of his own which will appear in his art: weaving, printing, architecture, painting, and sculpture.

A well-designed pattern creates a harmony, never becoming more important than the surface which it beautifies.

Pattern has been present in the art of all ages yet each has produced motifs which were appropriate for the specific surface to be enriched. An awareness of the many patterns that have been created by man in ages past can help us to create patterns that are appropriate for our environment today.

**Preparation Suggested:**
Remind the students to watch for the ways in which patterns are developed. During the process program they will be asked to design their own pattern.

**Film: Part II**
PAINTING: THE CREATIVE PROCESS 15 min., 16mm, snd., color, Film Associates

**Film Digest:**
Each artist has his own particular way of creating regardless of the form which his art takes. Sketching is one of the first steps by which most artists come to understand the structure and nature of the world around them. Past experiences, emotions, and all that they know and think aid them in creating patterns. Many artists gain rich experience by studying other artists and their art forms.

**Preparation Suggested:**
The students should watch closely to see how the artist's own experiences move from observation to sketching, and ultimately to the finished painting. During the process lesson students will look at the experiences of some people which might help them in creating their own patterns or pieces of art.

Program No. 18
Content Series No. 18 (cont)
Master Teacher - Judith Tidemann

All students will need two sheets of drawing paper, one sheet of notebook paper, a pencil, and colored pencils or crayons. If at all possible the students should be at desks or tables so that they can draw. Encourage the students to participate actively in the drawing of leaves and patterns. Some students may feel very limited by the brief time, but they should be assured that this is only the beginning for creating their own original patterns.

Biography of a painter, Reginald Pollack:

Reginald Pollack was born on Long Island. He was educated in New York and Paris, where he studied at the Academie de la Grande Chaumiere. He taught painting and drawing at Cooper Union, New York; was a visiting professor-art critic at Yale University; and a consulting specialist for the University of California Los Angeles, at their Human Relations Training Laboratory, their Sensitivity Training Intern Program, and their Creativity Seminar. Mr. Pollack's work has been exhibited and purchased by numerous museums including the Museum of Modern Art, the Whitney Museum of American Art, the Rockefeller Institute in New York, the University of Nebraska, the University of Glasgow, the Jerusalem Museum, the Collection de l'Etat, and others. He is considered an outstanding master in the field of modern art painting.

Vocabulary:

pattern

motif

Program No. 18
Process Series No. 18
Master Teacher - Judith Tidemann

Concepts Emphasized and Strategies Demonstrated:

During the program the students will do drawing from memory (leaves) and drawing of a new design pattern using any or all of five basic geometric shapes: circle, square, rectangle, triangle, and diamond.

The lesson moves from the life of the artist, Reginald Pollack, to the lives of the individual students. We will look at possible experiences they may have had that will aid them in developing their own creative patterns which will ultimately lead them to creating original works of art.

Painting and sketching are not the only media for students. Other examples of student work are shown to suggest that the field of art is unlimited in the variety of effects and techniques.

A few hints are given for defining art in the world around us. This is done to show the students how difficult criticism really is. A suggestion for small group discussion is given which the group may want to follow with the leaves or patterns work.

Since art communicates for the artist just as words communicate for a speaker, an analogy is drawn between the finished work of art, and words, sentences and paragraphs.

In conclusion we look at pieces of art that have received wide acceptance. The students are encouraged to look at the world around them and begin to create. They may find that they enjoy art. They may want to explore the area of art criticism, or they may develop a keen desire to enrich their own understanding and appreciation for beauty in their world around them.

Program No. 18
Inservice No. 18
Master Teacher - Judith Tidemann

## Interpretation and Discussion of Strategies

This program is prepared for the classroom teacher who is not an art specialist. A quick look at art in the light of existential education shows the importance of active participation in art rather then mere historical knowledge or appreciation.

We review some research studies of students aged ten to fourteen to see what is known about these children and their ability to create. We also take a look at how some gifted children are treated in the classroom and suggest some changes that could be made so they do not need to remain in a "minority of one" situation.

How does the creative process work? It is described by Torrance as preparation, incubation, illumination, and revision. Guilford and Brittain define the specific abilities which these children use as sensitivity, fluency, flexibility, originality, redefinition, observation, synthesis, and organization. We discuss how our teaching may need some changes in this direction to aid gifted students in their work. It may be necessary for us to redefine our teaching goals to make it more possible to use these learning processes effectively.

We emphasize that we should not limit the work of the creative child to only art and art forms, but we must also encourage this process in all areas. It may find embodiment in inventions, scientific theories, improved products, novels, musical compositions, paintings, or new designs.

Our world situation demands teaching that stresses creativity for then we are developing learning and doing patterns which will help the individual live in a more fulfilling world throughout his life.

Finally, we emphasize the teacher's responsibility to begin to define art and its place in the life of the students.

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# APPENDIX A

## Telecasting Schedule 1967-68
Summary of the First Year's Programs

| Classroom Strategies | Program Number | Film Titles | TV Teacher | Broadcasting Dates |
|---|---|---|---|---|
| Strategies for Using Paradoxes and Other Provocative Thinking Skills | 1 | The Universe | Dr. Frank E. Williams | 1-18-68 |
| The Creative Use of Analogues | 2 | The Baboons | Robert Samples | 1-15-68 |
| Adjustment to Development and Evaluation | 3 | Beginning of History Part I | Mrs. Shirley Frandsen | 2-01-68 |
| | 4 | Beginning of History Part II | Mrs. Shirley Frandsen | 2-08-68 |
| Operations from the Guilford Model Divergent Thinking | 5 | Journey Into The Past | Ron Berk | 2-15-68 |
| Paradoxes and Contrasts | 6 | The Living Stone | Rod Myers | 2-22-68 |
| The Creative Use of Analogues | 7 | Fifty Miles From Poona | Robert Samples | 2-29-68 |
| Paradoxes and Contrasts | 8 | Three Fishermen | Rod Myers | 3-07-68 |
| Strategies of Inquiry and Classroom Management of Inquiry Session | 9 | Journey From Etsa | Fred Rivkin | 3-14-68 |
| Operations from the Guilford Model Divergent Thinking | 10 | City Scene | Ron Berk | 3-21-68 |
| Strategies of Inquiry and Classroom | 11 | Way Out Men - Part I | Fred Rivkin | 3-28-68 |
| Strategies for Using Paradoxes and Other Provocative Thinking Skills | 12 | Way Out Men - Part II | Dr. Frank E. Williams | 4-04-68 |